ARCHIVES OF OTOLOGY.

A CASE OF ACUTE MIDDLE EAR SUPPURATION, COMPLICATED BY LABYRINTHINE FISTULA AND PARALYSIS OF THE ABDUCENS NERVE.

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DIPLOPIA from paralysis of the abducens nerve, suddenly occurring after a mastoid operation, is a symptom of rarity and one that is apt to cause in the mind of the operator grave apprehension of an intra-cranial complication. In order to clear up the pathology of this extension of the middle ear suppuration Gradenigo[1] has investigated 19 cases, 6 of his own and 13 that have been reported by other otologists, 4 of the 13 having been recently reported at the May 1904 meeting of the French Society of Otology and Laryngology.[2] Since then another case of otitic paralysis of the Abducens has been reported by Ricci.[3] It seems well, therefore, to present this case as a matter of record, especially as a fistula through the inner tympanic wall was demonstrated on re-operation as the probable avenue of extension of the infection. Gradenigo arrived at the conclusion that "this syndrome of clinical symptoms is the result of a circumscribed simple serous leptomeningitis localized about the tip of the pyramid and caused by the diffusion of the infection in the tympanum. In certain cases death resulted from the spread of the infection.

* Reported to the Los Angeles Eye and Ear Society.

[1] *Annals of Otology, Rhinology and Laryngology*, Dec. 1904.

[2] By Lannois and Ferrand, Lubet-Barbon and Cheval.

[3] *Arch. Italiano di Otologia*, vol. xv, part 6, abstract in the ARCH. OF OTOLOGY. (Oct. 1905).

In our case the finding of the labyrinthine fistula was not anticipated. On the contrary the persistence of the copious middle ear discharge after the mastoid operation had led us to suspect a perforation of the tegmen tympani with the formation of an epidural abscess. When the tegmen tympani was found intact and the labyrinthine fistula discovered, the middle cranial fossa was not opened. That involvement of the abducens resulted from extension of the middle ear infection through the fistula in the oval window, by way of the labyrinth, to the dura at the tip of the petrous, seems probable by the subsidence of the paralysis after the secondary operation.

History.— A—— W——, male, aged twenty-two years, was seen in consultation on January 17, 1905, on account of an acute ear trouble. One week before stuffiness, noises and pain began in the right ear, following a cold in the head of five or six days duration. He was admitted to the hospital with a temperature of 101°, slight mastoid tenderness, and some purulent discharge from the ear. Examination (three days later) showed moderate mastoid tenderness, chiefly over the antrum and tip and no œdema; a mucopurulent discharge from the middle ear; sagging of the posterosuperior canal and an inflamed bulging drum membrane with a small insufficient perforation. The temperature was 99.2°, the hearing was poor; watch was not heard on contact. There was some tinnitus, but no dizziness, and no other symptoms. There had been no previous ear trouble. His general condition was good. Microscopical examination of the aural discharge showed the presence of diplococci.

A free incision was made in the drum membrane. The usual abortive measures were unavailing. Three days later a simple mastoid operation was performed.

Mastoid Operation.—A complete ablation of the cellular structure was done. The findings were of no special interest. There was pus in most of the cells including the tip cells, and in the antrum. The dura and sinus were not exposed.

After operation the discharge and pain in the ear continued and gradually increased, although the mastoid wound was clean and the aditus remained open. There was some dizziness and considerable tinnitus. The drum membrane remained beefy red and bulging and was incised on two or three occasions to secure better drainage from

the middle ear. The temperature ranged from 98° to 100.2°, and the pulse was about 88. This condition continued for 12 days. On the 12th day after operation the the patient complained of considerable increase in the dizziness and of double vision, a symptom that he had not previously noticed and claimed never to have had before. Examination showed marked diplopia due to paralysis of the abducens nerve on the affected side. The fundus of the eye was found to be normal. The other ocular muscles responded normally. There were no other motor or sensory disturbances. No chills, vomiting or other symptoms occurred. The temperature was 98.6°, the pulse 78. The general condition was good, the mastoid wound clean and red; and there was nothing abnormal except the continuation of the middle ear discharge, deep-seated pain in the ear and some dizziness. The primary middle ear inflammation had been of only a few days' duration, and prior to this, the patient's hearing had been normal; so that a radical operation, which seemed indicated, was deferred. The paralysis persisted, the pain in the ear, radiating to the face, grew worse although the temperature remained practically normal, from 98° to 99°, pulse 68 to 88. On the 11th day after the appearance of the paralysis the typical radical operation was done.

Radical Operation.—The tympanic cavity was found full of granulations and pus; its mucous membrane was swollen; the malleus and incus were normal. When the cavity was cleaned out and dried, pus could be seen coming from the inner tympanic wall in the recess of the oval window—and apparently through that opening. The stapes unfortunately, was not found. It was likely broken and lost in the removal of the other ossicles. The fistula was probed and found to lead inward, apparently into the vestibule to a depth of about ½ cm, before bony resistance was met with. Its opening was enlarged and the fistula swabbed with a solution of bichloride. There was no necrosis of any other portion of the tympanum. The tegmen antri and the tegmen tympani were intact; the inner table of bone of the middle cranial fossa was found hard and was not opened. A Ballance meatal flap was made and sutured above, and the post-auricular wound left open for subsequent treatment. Facial twitching occurred two or three times during the operation, due to injury to the horizontal portion of the facial canal, which formed the upper rim of the fistula.

The pain subsided after the operation. The paralysis of the ab-

ducens nerve gradually passed off; diplopia entirely disappeared in four weeks. Slight facial paralysis resulted from the operation, but passed off within a week. At the first few dressings, a drop or two of pus could be seen coming from the fistula. This was wiped out with an alcoholic solution of bichloride and a small wick of gauze inserted to maintain good drainage. The discharge ceased within a week. The dizziness passed off in three weeks. The tinnitus persisted. The temperature rose to 102° after operation, dropped in three days to 99°, and was normal thereafter. The middle ear cavity was grafted five weeks after the radical and the post-auricular wound closed. The grafts took only partially. The post-auricular wound healed by primary union, and a collodion strip was substituted for the bandage on the seventh day. On September 25, 1905, (7½ months after operation) examination notes were made as follows:

Patient returned after two months absence, reported he had been working steadily, has had no return of the double vision, or dizziness and no pain or discharge. He has not used any irrigation, but has kept up the alcoholic drops (15 drops alcohol-boric, b. i. d.) The tinnitus (slight hissing) has persisted. The post-auricular scar is firm; the middle ear cavity is dry, hard, white and glistening. The tympanic cavity proper is somewhat narrowed; a small opening anteriorly leads to the Eustachian tube, which is dry. The drops were discontinued and the patient reported three weeks later and discharged, healed.

Functional Examination (September 25, 1905).

AD (Affected ear) Weber, away from. Schwabach, plus. Watch, faintly heard on contact. Stage whisper, questionable, at twelve inches; conversation, questionable, at two feet. Forks by air conduction, faintly heard; high forks better than low.

REMARKS.

The case presented some peculiar features, as follows:

I. *The involvement of the internal ear early in the course of an acute suppurative otitis media.*—While this is rare, one observer, Hinsberg,* out of 89 cases of labyrinthine fistulæ, found that 18 occurred from acute otitis.

* "Suppuration of the Labyrinth," by Victor Hinsberg of Breslau. Translated by Richard Jordan, New York. ARCH. OF OTOLOGY, vol. xxxi.

II. *The avenue of extension of the middle ear infection.*—This was clearly through the oval window or the upper rim of the window. Unfortunately a fistula into the labyrinth was not suspected before operation and a careful examination was not made of this recess until pus was seen oozing through the window a drop at a time. The stapes had already been lost, likely in the removal of the malleus and incus and granulations.

III. *The cause of the abducens paralysis.*—That the extension of the infection to the nerve sheath came by way of the labyrinth seems probable by the rapid subsidence of the paralysis after good drainage of the labyrinth was established.

IV. *The prompt recovery after re-operation.*—It is noteworthy that it was not necessary to remove the inner tympanic wall and do a complete curettage of the internal ear. Good drainage was sufficient. It is equally noteworthy that the delay after the mastoid operation, before doing a radical was too long and fraught with grave danger. In the light of the operative findings the escape from meningitis was narrow.

The functional test showed very slight if any hearing in the affected ear, whisper and speech being questionable, though there was some response to the forks by air conduction; also in Weber's test hearing was referred to the normal ear; all of which was to be expected from the labyrinthine inflammation. However, and this was repeatedly tested, Schwabach's test was positive on the affected side, which is contrary to expectation and is inexplicable.

V. *The conclusion* seems reasonable that the occurrence of abducens paralysis in acute suppurative otitis media means an inward diffusion of the tympanic infection; and when accompanied by the syndrome of the ear symptoms above noted, operative rather than palliative measures should be applied to the tympanic cavity.

SEROUS MENINGITIS.*

By ARNOLD KNAPP, M. D.

THE diagnosis of otitic intracranial complications is often obscured by symptoms referable to increased brain pressure, and we are sometimes agreeably surprised by the happy outcome of an exceedingly grave condition after an operation which, except for the evacuation of an excessive amount of cerebro-spinal fluid, has been without result as far as discovering a lesion of the cerebral structures is concerned.

The following case illustrates this condition.

A. M., male, 18 years of age, had always enjoyed good health except for frequent colds which affected his hearing. Three weeks ago, after a cold, the left ear began to discharge. He also suffered from severe headache in the left half of the head and vomited. The left mastoid process became tender and swollen. These symptoms continued for one week and then abated with the exception of the headache and vomiting. He lost flesh, was constipated, and his sight began to fail one week ago. He had some fever; the pulse-rate was slow; he was languid and somewhat stuporous.

On admission, January 31, 1905, patient is sallow, thin, but fairly well-nourished. Answers questions correctly though slowly. No vertigo, but his gait is unsteady.

Ears: Right ear. Mt. intact; pink; canal normal. H=10/20. Mastoid region normal. There is some tenderness on percussing the skull directly up and back of the mastoid process. Left ear: Mt. retracted; H=20/20.

Eyes: Left pupil larger than right; both react to light. Marked optic neuritis. R. V=15/50. L. V=15/20. Visual fields normal.

Temperature, 99°; pulse, 120; which dropped to 60 within an hour.

*Read Before Section on Otology, New York Academy of Medicine, November 5, 1905.

The slow pulse, retarded cerebration, headache and optic neuritis, suggested increased brain pressure, and coming on after an attack of acute otitis, were presumably due to an intracranial extension. The fact that the conditions in the ear and mastoid had been mild and were now almost entirely recovered from, though the symptoms of an otitic intracranial extension seemed to be present, is unusual, though not at all unknown. As to the form of intracranial infection, meningitis and sinus thrombosis could be readily excluded ; from the pressure-symptoms a brain abscess seemed most probable, though there were no focal symptoms. The presumable site of the brain abscess could be placed in the temporal lobe as the infection probably extended through the tegmen of the tympanum or of the antrum ; affections of the posterior cranial fossa, that is of the cerebellum, being usually secondary to a labyrinth complication or a disease of the sinus. A labyrinth complication could be excluded from the good hearing present and by the absence of the so-called labyrinthine symptoms, vertigo and nystagmus. There were no febrile symptoms suggestive of a sinus involvement.

Operation January 31, 1905. Chloroform narcosis. The mastoid antrum and the tympanum were exposed as quickly as possible and found to contain swollen but healthy mucous membrane and no pus. The ossicles were healthy ; the roof of the tympanum and antrum showed no defect. Nevertheless the tegmen was removed from the orifice of the tube back to the superior margin of the petrous pyramid. The dura over the temporal lobe was absolutely healthy and pulsated. The posterior segment of the mastoid process was then removed, in order to expose the sinus and the dura of the posterior cerebral fossa. At the upper posterior margin of the mastoid process the bone was found discolored and soft. After this was freely removed a large area of the dura and the lateral and sigmoid sinuses lay exposed. Corresponding to the region of affected bone, the dura directly above the knee of the sinus was thickened, discolored, bled freely, and was covered with apparently old granulations. A similar area of discolored dura was found over the sinus. The affected dura above the sinus was incised, and perfectly healthy brain exposed. The brain was punctured without result. The affected area over the sinus was next examined. The wall of the sinus was found very much thickened, but on opening into the lumen free hemorrhage took place. The bone was then removed down and back of the sinus to expose the cerebellum. The dura in this region was found perfectly normal. An incision

was made just posterior to the sinus and was followed by a gush of cerebro-spinal fluid. The incision was enlarged and kept open to facilitate the escape of liquor which continued in large quantities. The presenting cerebellum was normal.

The patient recovered well from the operation, and much to our surprise his improvement was immediate and continuous. The subsequent course was uneventful, though at the first dressing on February 6, 1905, the area of the dura which had been found discolored at operation had given way as if it were gangrenous, and the large defect was filled with infiltrated brain tissue. This was removed with a curette. The protruding area subsequently contracted and formed a circumscribed cerebral hernia of about the size of a walnut. Notwithstanding this incident, the symptoms were all relieved from the time of operation. The headache had totally disappeared. The boy's mental condition became much brighter. His pulse rose to 78 and his temperature was normal. The vision improved, and on March 25th it was normal in each eye. The improvement could be followed by observing with the ophthalmoscope the gradual retrogression of the optic neuritis. On March 30th, a plastic operation was done by which the cerebral hernia was covered.

We have in this case a train of symptoms suggestive of a severe intracranial affection, secondary to a pachymeningitis with gangrene of the dura induced by an ostitis of the mastoid process after acute otitis. The eradication of the mastoid focus and the escape of large quantities of c. s. fluid were followed by the relief of all the symptoms, and led to the patient's recovery. In the light of our present knowledge we are forced to the diagnosis of serous meningitis.

Our knowledge of serous meningitis is still far from complete. Brieger* states that after it was found that increase of c. s. fluid causes a condition resembling meningitis which disappears on the evacuation of this fluid, aural cases where severe cerebral symptoms have been relieved by operations without result except for the evacuation of c. s. fluid, have also been classed as serous meningitis. There have been no autopsies; recovery is in fact a characteristic of the disease. Clinically the condition has been frequently observed, especially after otitic extradural abscesses and suppuration within

*Encyclopedie der Ohrenheilkunde, 1900, p. 478.

the labyrinth. The labyrinth as is well known communicates with the subarachnoid space by several channels.

I have also observed an example* of the latter variety which presented several interesting features.

In brief, it was a case of a girl, 16 years of age, suffering from chronic purulent otitis, caries of the labyrinth and numerous intracranial complications. Following the first operation the patient did perfectly well until one month later, when some granulations in depth of wound were curetted. She was suddenly taken ill on the same day with a chill, headache and vomiting. When readmitted to the hospital two days later, she was very restless. T. 104° F.; P. 100. Complained of severe headache and pain in the lower extremities and rectum, but the sensorium were unclouded. The head was drawn back and spine was rigid. The eyes were normal. Lumbar puncture evacuated a large amount of clouded fluid under pressure. The diagnosis of purulent meningitis was made and the condition was regarded as practically hopeless. This case recovered. It illustrates the early and chief involvement of the spinal cord in cases with previous labyrinth symptoms.

If we compare these two clinical pictures we find, in the first, symptoms due to increased intraventricular pressure, while in the second, the symptoms are those found in disease of the spinal meninges. It cannot be decided whether these two forms belong to the same morbid process, the difference in symptoms depending solely upon the varying localization.

According to Körner,[1] Merkens[2] has offered the most plausible explanation of this form of meningitis. He says that just as inflammatory or collateral œdema surrounds any purulent focus, caries or suppuration in the neighborhood of the dura will affect the meninges. The increase of c. s. fluid after certain infectious diseases, like typhoid or pneumonia, is well known. The extreme reactive susceptibility of the arachnoid or pia to toxins from inflammations in distant parts of the body, will be still more manifest if the original process occurs in their immediate vicinity. In middle ear suppuration and its

*The case was reported in the ARCHIVES OF OTOLOGY, vol. xxxiii, p. 478.

[1]Körner. Die Otitischen Erkrankungen, etc. Third edition, 1902, p. 66.

[2]Merkens. *Deutsche Zeitschr. f. Chir.* vol. lix.

complications, toxins can easily penetrate to the meninges of the brain similar to an extension of collateral œdema. This serous toxic inflammation of the meninges then may lead to an internal hydrocephalus. A shutting off of the ventricles is presumably of frequent occurrence. The symptoms disappear after operative eradication of the otitic process, like the rapid diminution of inflammatory œdema after incision of a furuncle. The toxic action may also be extended to the underlying brain and the toxic encephalitis explains the focal symptoms, such as aphasia, paralysis, which are sometimes observed. Pathologically serous and purulent inflammations are but grades of the same process, at the same time it is not quite correct to say that a serous inflammation is but a milder form of inflammation than the purulent, as it frequently is but the early stage of the latter.

Körner* also draws attention to the interesting fact that the cases of serous meningitis which have been reported have been principally in youthful individuals. Seventy-five per cent. were under 25 years of age. Moreover, the severe cerebral symptoms occasionally observed in simple inflammation of the middle ear in children and in young people, are probably due to a toxic meningo-encephalitis.

As regards treatment, the symptoms due merely to the increased intracranial pressure would be relieved by a release of the c. s. fluid, but this is not all essential. The increased brain pressure is never so severe in these cases as to be fatal of itself, and the mere evacuation of fluid in view of the extremely rapid reaccumulation in the presence of an inflammatory process, is of but secondary moment. The main feature in the treatment is the eradication of the primary disease in or about the temporal bone.

* l. c., p. 12.

SOME RELATIONS IN THE BLOOD-SUPPLY OF THE INNER EAR WHICH HAVE A PRACTICAL BEARING ON THE CLINICAL STUDY OF OTOLOGY.*

By GEORGE E. SHAMBAUGH, M. D.

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(*With Illustration on Text-Plate No. 1.*)

WHEN asked to discuss the blood-supply of the inner ear before this Society it occurred to me that it would be of interest to answer, in part at least, a question which is often asked by the practicing otologist. What application can be made by the otologist of a knowledge of the circulation in the labyrinth of the ear?

Our interest in the study of an anatomical question is primarily a scientific one, and our efforts are directed first of all to ascertain the scientific facts; still as practical otologists, we take naturally a keener interest in those anatomical facts which have a practical bearing on our clinical studies. The symptoms produced by an anaemia or a hyperaemia of the labyrinth, the symptoms set up by the rupture of a vessel or the obstruction of an artery by an embolus, all help to increase out intrest in the distribution of the vascular supply of the labyrinth In this paper an effort is made to avoid as far as possible the recital of anatomical details and to aim rather to discuss the more interesting points in the circulation of the inner ear, especially those which have a practical bearing on the clinical study of otology. The points of special

* Read before Otological Section, N. Y. Academy of Medicine, Nov. 9, 1905.

interest in the study of the blood-supply for the internal ear group themselves under the following headings:

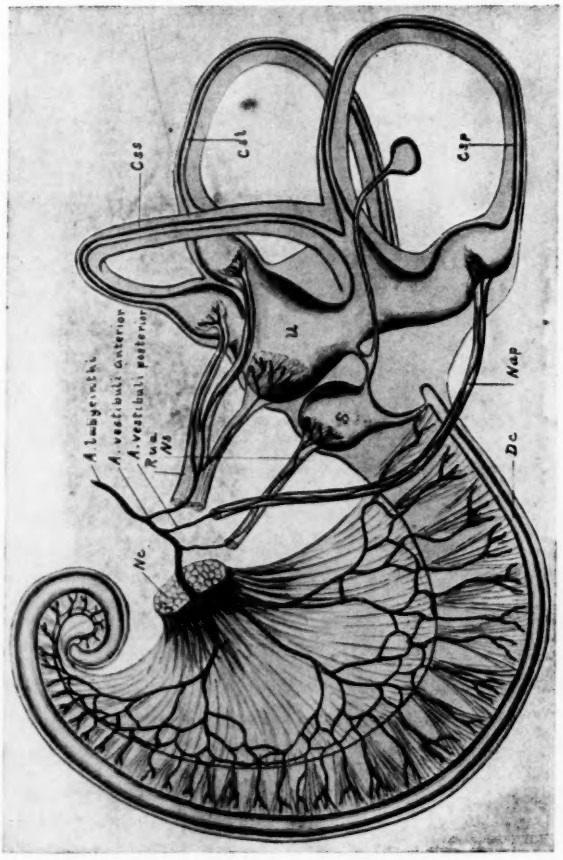
1. How is the arterial blood brought to the labyrinth.
2. How is the venous blood carried away from the labyrinth.
3. What is the distribution of the main arterial and venous trunks within the labyrinth especially in regard to their relation to the supply of the several areas in the labyrinth of highly specialized structures including the nerve endings.
4. What relation exists between the blood-supply of the membranous labyrinth and endosteum and the blood-supply of the bony shell or capsule of the labyrinth. Do the blood-vessels of the membranous labyrinth communicate with those in the tympanic cavity?

The arterial supply is brought to the internal ear through a single vessel, a branch of the basilar artery which enters the labyrinth along with the auditory nerve through the internal auditory meatus. The only exception to this arrangement that has been noted occurs as an anatomical variation in the labyrinth of the calf where I found that occasionally an artery penetrated the bony capsule at the distal end of the crus commune, and supplied the membranous semicircular canals in this region.

Regarding the manner in which the venous blood is carried away from the labyrinth there exists a diversity of opinion.

Siebenmann in his work on the blood-supply of the human ear describes three channels for the exit of venous blood from the labyrinth. The one, a vein in the internal meatus, drained the blood from part of the cochlea. The second, a vein which left the labyrinth along the aquæductus cochleæ, drained blood from the cochlea as well as from the vestibule. The third, a vein which left the labyrinth along the aquæductus vestibuli drained from the semicircular canals and the vestibule. This arrangement of veins leaving the labyrinth corresponds with the description given by Schwalbe. Eichler in his work on the blood-vessels of the human ear found but two routes by which the venous blood left the labyrinth, the vein of the aquæductus cochleæ and the vein of the aquæductus vestibuli. He found no vein in the internal meatus

ILLUSTRATING DR. SHAMBAUGH'S ARTICLE.



Nc. Nervus cochleæ.
Rua. Ramus utriculo-ampullaris.
Nap. Nervus ampullaris posterior.
Ns. Nervus sacculi.
U. Utriculus.
S. Sacculus.
Dc. Ductus cochlearis.
Css. Canalis semicircularis superior.
Csl. " " lateralis.
Csp. " " posterior.

which drained blood from the cochlea. In my own work on the blood-supply of the internal ear, which consists of a detail study of the blood-supply in the labyrinth of the pig, the sheep, and the calf, I found that a single vessel, the vein of the aquæductus cochleæ, drained the blood from the entire labyrinth. No vein was found in the internal meatus nor yet accompanying the aquæductus vestibuli which drained blood from the labyrinth. A single exception to this arrangement was found in the labyrinth of the calf where as an anatomical variation the vein of the crus commune was occasionally found leaving the labyrinth along the aquæductus vestibuli. This difference between the observation made by Siebenmann and my own can very readily be accounted for by variation in the different species studied.

A striking peculiarity in the blood-supply of the labyrinth is at once apparent that whereas the arterial supply is brought to the labyrinth by way of the internal meatus the venous blood leaves the labyrinth, at least for the most part, at a point distinct and separate from this, namely, along the aquæductus cochleæ.

As regards the distribution of the main branches of the labyrinthine artery within the labyrinth there exists a general uniformity of plan. My own observations on this point correspond closely with the results obtained by Siebenmann. Considerable practical interest attaches itself to the distribution of these vessels which fill the role of terminal arteries carrying the sole blood-supply to definite distinct areas in the labyrinth, for, with the knowledge of the areas supplied by these several branches of the labyrinthine artery, we have a key which in the study of the symptoms resulting from rupture of one of these vessels or the lodgment of an embolus in this or that branch may help in the closer study of the function of the several parts of the internal ear about which we are still so much in the dark.

The first branch of the labyrinthine artery is a large trunk which follows the course and distribution of the branch of the auditory nerve called the ramus utriculo-ampullaris. This artery is the sole supply for the macula acoustica utriculi and

the ampullæ of the horizontal and the superior semicircular canals.

The second branch of the labyrinthine artery like the first goes to supply the vestibule. Its distribution is the same as that of the ramus ampullaris posterior of the auditory nerve. It carries the sole arterial supply to the ampulla of the posterior semicircular canal. Branches from this artery supply also the posterior crura of the posterior and the horizontal semicircular canals and the crus commune.

These first two branches of the labyrinthine artery supply the entire vestibule and semicircular canals with the exception of the saccule. This structure has again a distinct and separate arterial supply through one or several branches which leave the labyrinthine artery at the base of the cochlea.

For obvious clinical reasons the question of the arterial supply of the cochlea is one of great interest. What disposition is made of the labyrinthine artery as it enters the cochlea? How are the several parts of the cochlea supplied, are distinct areas in the cochlea supplied as we found in the vestibule by terminal arteries? These questions are of special interest because of the accepted view regarding the function of the cochlea that the perception for the different tones is located in definite and distinct areas, the higher tones near the beginning of the basal coil and the lower tones toward the apex of the cochlea.

The labyrinthine artery while still in the bottom of the internal meatus after the branches which go to supply the vestibule are given off, breaks up into a number of branches before it enters the cochlea. The total number of these branches varies in different species. These several branches are connected with each other by a series of anastomotic loops before any of the terminal branches are given off to the several parts of the cochlea. The number of these anastomotic loops varies again with the different species. They were found most pronounced in the ear of the calf and least in the ear of the sheep. This arrangement of anastomotic loops or arcades between the several branches of the labyrinthine artery at the base of the cochlea constitutes an admirable protection against

injury resulting from occlusion by an embolus or a rupture of any one of these vessels. The part of the cochlea where this protection is least developed is in the terminal coil. This coil of the cochlea is supplied by a terminal artery. The anastomotic loops between the several branches of the arteries of the cochlea are lodged in the modiolus near the base of the lamina spiralis ossea, and follow the spiral direction of the coils of the cochlea. This area has received the name of tractus spiralis arteriosus. From the vessels in this area two sets of terminal arteries are given off. One set runs out along the lamina spiralis to supply the organ of Corti, the other set arches over the scala vestibuli and supplies the ligamentum spirale. This arrangement of the arterial tree of the cochlea provides that an injury through disturbance in the circulation is not likely to involve any considerable area of the cochlea on account of the collateral circulation provided by the anastomotic loops between the several branches which supply the cochlea, an exception being the terminal coil which is provided with a terminal artery not anastomosing with the other vessels. On the other hand the organ of Corti throughout its entire extent as well as the ligamentum spirale is supplied by terminal arteries each one of which is distributed to a distinct though small area.

A study of the disposition of the several branches of the labyrinthine artery brings out the fact that the several parts of the labyrinth are supplied through terminal arteries. The areas that are in this manner isolated by their arterial supply from the rest of the labyrinth are as follows:

1. The utricle together with the horizontal and superior semicircular canals. These are supplied through the first branch of the labyrinthine artery.

2. The ampulla of the posterior semicircular canal, supplied entirely through the second branch of the labyrinthine artery.

3. The saccule, supplied by several arterial branches distinct from the remainder of the vestibule.

4. The cochlea, supplied as a whole by branches which are distinct from those that go to supply the vestibule and semicircular canals, while the several parts of the organ of Corti

throughout the coils of the cochlea are supplied by terminal arteries which isolate distinct though small areas from the adjoining parts.

That these facts can be utilized in a closer clinical study of cases where a disturbance in the blood-supply of the labyrinth has occurred I believe there is little doubt. The occurrence of a typical case of Menière's disease where there is a profound disturbance in the vestibule and semicircular canals as evidenced by the occurrence of vertigo and nausea, as well as a profound disturbance in the cochlea, as shown by the occurrence of severe tinnitus and deafness, can be brought about only by some disturbance in the circulation of the entire labyrinth. The report of cases of this sort is not uncommon. Not enough attention has been given to the fact that disturbance in the circulation of the labyrinth may be limited to one or several of the terminal arteries supplying certain areas without involving the remainder of the labyrinth. Such a disturbance in the circulation of the inner ear would not result in producing the typical Menière's symptom-complex. For example, the lodging of an embolus in the anterior vestibular artery would result in disturbance limited to the utricle and the horizontal and superior semicircular canals. The rupture of the posterior vestibular artery would cause disturbance limited to the posterior semicircular canal. The occurrence of disturbance in either one or both of these vessels would result in the production of disturbance of equilibrium without molesting the function of hearing. On the other hand a disturbance in the circulation may be limited to the cochlea without involving the vestibule or semicircular canals. Such a lesion would produce tinnitus and deafness, but not disturbance in equilibrium. Again an embolus lodging in the terminal artery which supplies the apical coil of the cochlea would perhaps cause deafness for the lowest tones without disturbing the upper part of the scale. Minute hemorrhage may occur from any of the terminal arteries that run out along the lamina spiralis to the organ of Corti, producing disturbance of hearing for certain tones without affecting the remainder of the scale.

There exists in the blood-supply for the organ of Corti an interesting arrangement of the vessels which in a large measure provides against too great a disturbance occurring in any particular area through the shutting off of the terminal artery supplying this area. This arrangement consists of one and often two spiral vessels lying directly under the organ of Corti. The outer one of these vessels is placed directly under the tunnel of Corti. Schwalbe described these spiral vessels as beginning at the lower end of the basal coil and running the entire length of the cochlea to terminate at its apex. In reality these so-called spiral vessels are but the elongated capillary loops formed from the outer series of capillaries given off from the vessels which radiate out along the lamina spiralis. They are connected with each of the many terminal arteries radiating out along the lamina spiralis to supply the organ of Corti. In the event of the blocking up or the rupture of one of these terminal arteries these spiral vessels are able, at least in a measure, to keep up the blood supply for the area of the organ of Corti thus affected.

One should not expect the clinical symptoms resulting from disturbances occurring in this or that branch of the labyrinthine artery to be capable of producing a too sharply defined clinical picture outlining the area involved. In the first place our knowledge of the function of several parts of the labyrinth is not exact enough to permit of a too accurate location of the area involved from the study of the symptoms produced, and in the second place in cases presenting a profound disturbance in the circulation of the vestibule and semicircular canals it is rational to expect at least a more or less marked temporary disturbance of the function of the cochlea. In a similar way a profound disturbance in the circulation of the cochlea would probably produce a temporary disturbance of the function of the remainder of the labyrinth.

The venous trunks of the labyrinth follow closely the distribution of the main arteries with the difference already referred to that instead of leaving the labyrinth at the point where the arteries enter, through the internal meatus, they all leave the labyrinth, at least in the species studied by me, along the aquæductus cochleæ.

The fourth question in the circulation of the labyrinth that has an important clinical bearing in the relation existing between the blood-vessels which supply the membranous labyrinth and endosteum, that is the ramifications of the labyrinthine artery, and those that are found in the osseus capsule surrounding the labyrinth.

It is a well known fact that the blood-vessels supplying the structures about the labyrinth communicate freely with those found in its bony capsule; the blood-vessels of the mucosa lining the tympanum send branches into the bony wall of the promontory; blood-vessels from the dura penetrate the area between the semicircular canals at the fossa sub-arcuata; and the blood-vessels of the temporal bone surrounding the labyrinth communicate freely with those of the capsule.

The question is whether the ramifications of the labyrinthine artery which supply the endosteum of the labyrinth penetrate the bony capsule. Since the blood-vessels of the periosteum are known to supply the underlying bone, we would expect perhaps to find the blood-vessels of the endosteum lining the cavities of the labyrinth also supplying the surrounding bony capsule. This view has found expression through Politzer, who believed he could demonstrate communications between the blood-vessels of the mucosa of the cavum tympani and those found in the membranous labyrinth and endosteum. The opposite view was first expressed by Hyrtl, who held that the blood-vessels of the inner ear from the time the artery enters the labyrinth at the bottom of the internal meatus until the veins leave the labyrinth, form a closed system, which at no point communicate with the blood-vessels of the surrounding structures. This latter view is the one adhered to. Recently Alexander, of Vienna, reported the presence of communications between the blood-vessels of the middle and the internal ear. I have made a study of the problem in the ear of the calf and was able to demonstrate that the branches of the labyrinthine artery supplying the endosteum penetrate the bony capsule at a number of distinct points, chiefly about the base of the cochlea and about the vestibule, and that in the ear of the calf at least communications apparently do ex-

ist between the blood-vessels of the mucosa of the cavum tympani and those of the membranous labyrinth and endosteum.

The existence of such communications between the blood-supply of the labyrinth and that of its bony capsule may be of considerable clinical importance. In the first place in the condition known as otosclerosis where a change in the ivory-like bone of the capsule to spongy bone takes place, communications between the blood-supply of the capsule and the internal ear might result in a more or less pronounced alteration in the circulation of the inner ear, such as might account for the tinnitus which is such a constant symptom of this condition. In the second place if communications exist between the blood-supply of the tympanum and that of the inner ear this condition may have a far reaching clinical significance not alone in connection with the suppurative processes in the tympanum but in the catarrhal processes as well.

INFECTIVE SINUS THROMBOSIS:

A DISCUSSION OF CERTAIN VIEWS RECENTLY ADVANCED.*

By PHILIP D. KERRISON, M. D.

NEW YORK.

(*With One Illustration on Text-Plate II.*)

IN the last issue of the ARCHIVES OF OTOLOGY (October, 1905) appeared a very interesting monograph on infective sigmoid-sinus thrombosis, by Dr. John D. Richards, of New York.

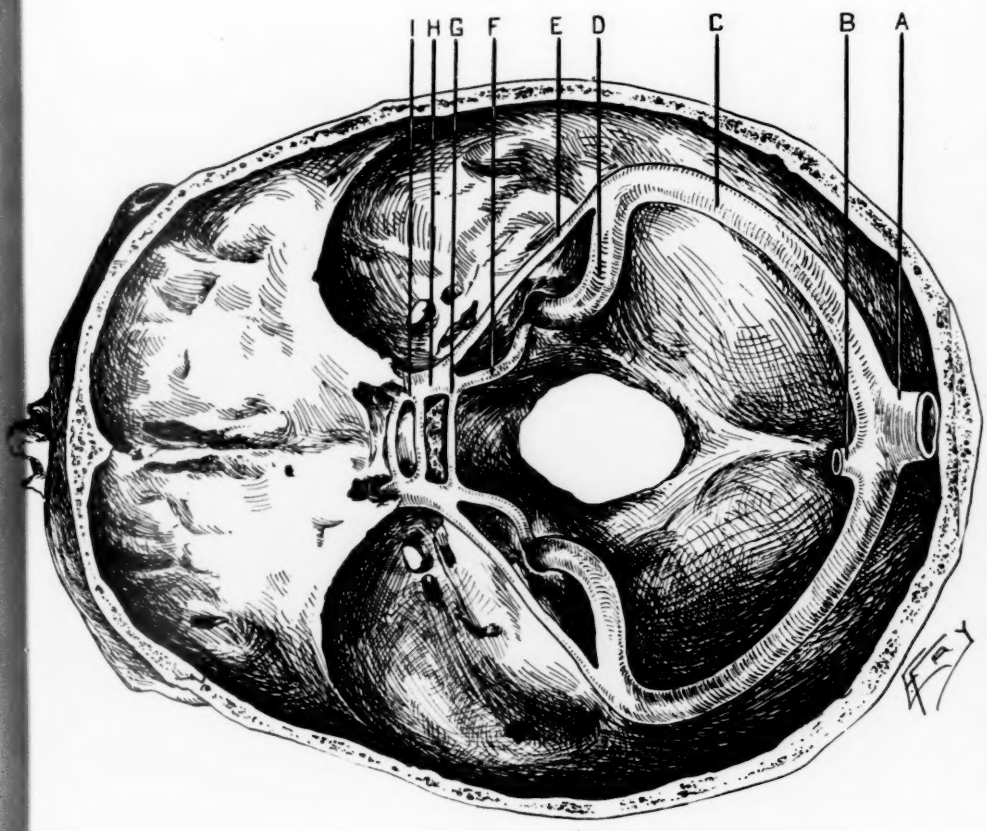
The writer calls our attention to the formidable character of the disease; and to the fact that the symptoms (*i. e.* those characteristic of septic absorption) are indicative not of clot formation, but of a later stage in which the thrombosis, having become infected, undergoes disintegration, septic particles being conveyed by the venous current to the right side of the heart. This, of course, is the only correct view, and one which no one will question.

Basing his remarks upon forty-four cases of infective sinus thrombosis which he has had an opportunity personally to observe and follow (of which, however, no details are given), the writer gives several suggestions as to operative technique, choice of instruments, etc., which are well worthy of consideration. He then proceeds to state and elaborate certain views, to discuss which is my purpose in presenting this paper.

The question proposed for discussion by Dr. Richards is simply this: Shall we expose and lay open the lateral sinus

*Read before the Otological Section of the New York Academy of Medicine, on December 14, 1905.

CRANIAL BLOOD SINUSES.
To Illustrate Dr. Kerrison's Article.



A. Torcular Herophili.
B. Straight Sinus.
C. Lateral Sinus.
D. Sigmoid Sinus.
E. Superior Petrosal Sinus.
F. Inferior Petrosal Sinus.
G. Transverse Sinus.
H. Cavernous Sinus.
I. Circular Sinus.

in all cases of acute or chronic mastoiditis, in which we have reason to suspect the existence of a thrombus? or shall we resort to this procedure only in the presence of symptoms or physical signs making such a diagnosis reasonably sure? His own views in the matter are expressed as follows:

(*a*) "If during mastoid operation we expose a sinus which upon careful examination seems suspicious, we should open the vessel *regardless* of the lack of symptoms;" and again:

(*b*) "When operating upon cases of mastoiditis in which symptoms of septic absorption pointing to sinus thrombosis are present, we will find it conservative practice to open the vessel, *regardless of its appearance, of its feel or of its pulsation.*"

Before discussing the first proposition,—viz., that one should open all sinuses suspected of containing thrombi, regardless of the presence or absence of symptoms,—one involuntarily asks upon what gross pathological changes in the vessel wall one should consider oneself justified in suspecting the presence of a clot. Let us see what the writer says of the diagnostic value of (a) color, (b) pulsation, (c) granulations and increased rigidity:

(*a*) *Color.*—"There are some who lay such stress upon discoloration of the sinus as to look upon it as an index of the condition within the vein, but of all factors of diagnostic value it is the most fickle."

(*b*) *Pulsation of the sinus wall.*—"Pulsation of a vessel wall, or absence of pulsation, is of little value in diagnosis."

(*c*) *Granulations and increased rigidity.*—"A parietal clot may be present which eludes detection. If granulations invest the vessel it is generally impossible to determine whether the resistance encountered upon palpation is due to a thrombus within, or to a thickened vessel wall and the granulation without. A positive diagnosis is rarely made before the sinus is opened. If after a careful examination of the vessel (taking into consideration its appearance, feel, color, etc.), *we are in doubt* as to the presence of a thrombus, the vein should be opened regardless of the lack of symptoms."

The above are not sentences carefully selected among

many. *They are practically all* that is said as to the physical changes which should lead one to suspect the existence of a clot. Apparently, then, a thickened sinus wall covered with granulations represents the condition which should be regarded as pointing most strongly to the possibility of a thrombus.

This view hardly seems to be based upon a proper interpretation of the pathological processes involved. Granulations do not form upon normal tissue. Their presence upon the dura forming the outer coat of the sinus is evidence of inflammatory changes involving at least the outer coats of the vessel. Such inflammatory changes must, therefore, necessarily mean thickening and increased resistance to pressure in that portion of the sinus wall covered by granulations. It does not necessarily follow, however, that the inner coat of the vessel is involved in inflammatory process; and in the vast majority of cases there is reason to believe that such involvement does not take place. In the presence of granulations, therefore, the vessel wall must be thickened, and must offer increased resistance to the palpating finger. In cases of extensive mastoid necrosis, involving the bony covering of the lateral sinus, a thickened sinus wall, covered with granulations, is by no means uncommon. That the great majority of such cases recover promptly after all diseased bone has been removed, is a fact that will be questioned by few surgeons whose experience in mastoid surgery has been considerable. As to the question of opening such a vessel for the purpose of determining the presence or absence of a beginning parietal clot, I feel very strongly that such a procedure,—in the absence of symptoms,—is not only inadvisable, but absolutely at variance with all sound surgical principles. That the formation of granulation tissue may represent either disease, or a phase of reparative inflammation,—the new connective tissue being conservative and protective,—is a fact long since generally recognized. As types of lesions in which this process represents a necessary stage of repair may be mentioned wounds with loss of substance and serous membranes which in the course of an acute exudative inflammation have been

denuded of their endothelial covering. Arguing an analogy between the granulations covering an inflamed dura and those lining an inflamed serous membrane (*e. g.*, the peritoneum in a localized appendicitis abscess), let us follow, if we can, the gross pathological changes which probably lead up to the thickened, granulation-covered dura which all of us have seen covering the outer wall of the sinus in cases of extensive mastoid necrosis. Let us suppose a case in which not only the intercellular bone substance, but also the bony wall of the sinus groove has undergone necrosis. The dura covering the sinus is now in contact with carious bone or separated from it only by fluid pus. The outer coat of the vessel (*i. e.*, the dura) soon undergoes changes, changes characteristic of an acute exudative inflammation; *i. e.*, first, dilatation of the blood vessels and subsequent retardation of the blood current; next, transudation of serum and emigration of leucocytes from the veins into the surrounding tissues. Unless quickly relieved, there is a proliferation of new cells, and the surface layer of endothelial cells undergoes necrosis. Upon this denuded surface granulations soon form. The vessel wall is now thickened by the products of an acute exudative inflammation, *but from further infection it is guarded by a protective layer of granulations.* Removing from contact with these granulations all necrotic and diseased tissues, we pave the way in the vast majority of cases for a safe and fairly rapid recovery. Incising the vessel wall, we at once admit to contact with its inner coat,—perhaps in a state of simple congestion,—and to the cut surface, the germs which are inseparable from granulations which have been bathed in pus. Shall we open this vessel on account of its increased rigidity and covering of granulations in a patient presenting no symptoms of sepsis? Again I wish to record my conviction that such a procedure would be in contempt of all recognized surgical principles.

As to the method to be employed in exploring a suspected sinus, the writer lays much stress on the importance of making a sufficiently free incision to examine thoroughly the interior of the vein. He says: "When only a sufficient opening in the vessel is made to allow the introduction and manipulation

of a curette, and the vessel is not slit widely open throughout the entire length of involvement, so that we can see the condition of its interior, any fistulous tract leading into the subdural space," etc., may be overlooked. But what if we find no clot? I have searched in vain for any statement as to the writer's views on this point. Obviously, to coaptate the edges of the wound would be to invite sepsis. The mastoid wound, in spite of any effort we may make at sterilization, is a pus cavity which now communicates by an extensive opening with the interior of the sinus. Clearly but one course is open to us,—viz., obliteration of the sinus throughout the entire extent of the incision. But can we be sure that we have not sown the seeds of a septic thrombus lower down? Has the information we have obtained justified the risks incurred? Would the possible early discovery of a clot in isolated cases justify the risks to which the many would be unnecessarily exposed were the writer's views generally accepted? The writer tells us that we should open freely all sinuses which are suspected of containing thrombi, but makes no statement as to the physical changes in the vessel wall which would justify this suspicion. He prescribes radical prophylactic measures against problematic sepsis, but gives no indications therefor.

SYMPTOMS OF SEPTIC ABSOPTION AS AN INDICATION FOR OPENING THE SINUS.

Let us return now to the second proposition,—viz., that in the presence of symptoms characteristic of septic absorption, we should open the sinus in spite of the absence of demonstrable changes in the vessel wall. Undoubtedly there are cases in which symptoms of sepsis, which can be traced to no other cause, may not only justify but demand exploration of the sinus. It must be remembered, however, that the symptoms associated with sinus thrombosis are simply those of periodic septic absorption. They are not pathognomonic of any one lesion, nor do they constitute a symptom-complex intended by nature—even during severe mastoiditis—for the exclusive use of the otologist. It hardly seems safe, therefore, to formulate any dogmatic or invariable rules for the management of such cases.

The statement that the sinus should be opened in all cases in which characteristic symptoms cannot otherwise be accounted for, is too sweeping. It altogether ignores the varying powers of observation displayed by many technically competent surgeons; and fails to take into account the many recorded cases, and still more numerous cases seen but not recorded, in which pyæmic symptoms, occurring during severe mastoiditis, have ultimately to be ascribed to undiscovered intercurrent disease, or pass without surgical intervention, and in passing carry with them the secret of their causation. It makes no allowance for variations in the age of the patient, and ignores the fact that in young children such symptoms not infrequently result from absorption from the mastoid lesion proper, no involvement of the sinus having occurred. I have in my own operative experience seen several cases in which symptoms quite typical of intra-sinous infection have disappeared completely after the removal of all diseased bone.

In regard to the method of exploring the sinus in these cases the writer says: "In those instances in which symptoms of sinus thrombosis are present, in which after opening the sinus we find it uninvolved, and being unable to account upon other grounds for the symptoms present, we should expose sufficient of the sinus *to allow the exploration of both jugular bulb and superior petrosal sinus.*" Again, supposing that no evidence of disease is found, how shall the surgeon proceed? This important point is not covered by the writer's paper. Obviously, complete obliteration of the sinus is the one theoretically safe method of completing the writer's exploratory operation.

I do not wish to be understood as denying the wisdom of opening the sinus in certain cases upon the symptoms alone. That we are sometimes called upon to assume this risk in the hope of saving life, is a fact generally conceded. I do believe, however, that there are many cases in which the exposure of a fair expanse of healthy sinus wall, by removal of the overlying bone, will justify the surgeon in pausing before further surgical intervention. The wisdom of such delay can be decided by no rule of thumb. Whether after exposure of the

sinus the surgeon shall proceed at once to explore the interior of the vessel is a question which should be decided only after careful weighing of all the data at hand,—*e. g.*, the patient's age, history, history of the attack, present condition, duration of symptoms, etc., etc.

To epitomize,— I believe (1) that the sinus should be opened only in the presence of symptoms or physical signs pointing fairly definitely to intra-sinous involvement; and (2) that to advise opening the sinus in spite of the absence of symptoms in all cases in which the surgeon suspects the existence of a clot, without any definite statement as to the physical signs justifying such a suspicion, is an inexact and unscientific method of expression which should not find place in otological literature.

An interesting part of Dr. Richards' paper is that which deals with the forces influencing the blood current in the jugular bulb. The aspiratory influence of inspiration upon the blood in the jugular bulb and its bearing upon the dissemination of septic emboli is very clearly brought out. The attempt to analyze forces acting separately upon the two vessels which unite to form the internal jugular vein is not quite so convincing. When either the sigmoid or the inferior petrosal sinus becomes obstructed, it is clear that the current in the vessel which remains patent must be accelerated. But that the position and direction of the inferior petrosal are such as to favor aspiration of septic matter from the bulb into the jugular current during operation, there is reason to doubt. Dr. Richards devotes considerable space to proving that "the blood stream in the inferior petrosal sinus is in all probability a particularly swift current, having a more rapid flow than the current of the sigmoid sinus." In support of this proposition he says:

(1) "In direction it represents the continuation of the internal jugular vein, and the mouth of the sinus is aimed directly at the opening of the jugular, so that the inferior petrosal pours its blood stream directly at the orifice of that vessel.

(2) "Whatever the aspiratory influence may be, it propor-

tionately is exerted to a greater extent upon the inferior petrosal sinus than upon the sigmoid; for the sigmoid is somewhat protected from aspiration by its varying curves, by its right-angled position to the jugular vein, and by reason of the fact that the jugular bulb is on a higher horizontal level than the horizontal limb of the sigmoid sinus." "The arrangement of the inferior petrosal sinus, however, instead of suggesting a provision against aspiration, suggests the contrary. A short, wide, straight and incollapsible vessel, *on a higher level than the jugular bulb, with a sharp declivity*, placed in direct line of aspiration," etc., would seem to suggest that the inferior petrosal exerts a controlling influence upon the blood current in the intra cranial sinuses.

A little reflection and dissecting-room study will convince us that the above statements, so far as the peculiarities of the inferior petrosal may influence aspiration during the course of an operation for sinus thrombosis, are misleading. Let us review the points made in the order in which they are advanced:

(1) That the inferior petrosal sinus *in direction* represents the continuation of the internal jugular; if this is intended to convey the idea that the general direction of the inferior petrosal is even approximately that of the internal jugular vein, the impression received is hardly in accordance with the facts. The general direction of the inferior petrosal forms with that of the internal jugular vein an angle varying in different skulls from 90 to 100 degrees; for while the direction of the inferior petrosal is outward, downward and backward, the vein is directed strongly forward, bringing the axis of their currents into a position nearly at right angles with each other.

(2) As to the influence of gravity;—*i. e.*, that the direction of the inferior petrosal represents a sharp declivity; that the jugular bulb is on a lower level than the inferior petrosal (whereas it is on a higher level than the horizontal limb of the sigmoid sinus):—with the patient in the position for operation, —*i. e.*, in the horizontal position with the head turned to the side opposite the lesion,—most of these conditions are absolutely reversed. For the direction of the current in the inferior petrosal is now upward (*i. e.*, against gravity), and the

blood stream must enter the bulb at a still higher level (see illustration). In the operating position, therefore, the above conditions more than offset any obstructing influence which the varying curves of the sigmoid may exert upon the current in the lateral sinus; for the stream in that vessel now flows downward,—*i. e.* with gravity,—toward the jugular forward. The peculiarities of the inferior petrosal sinus,—so far as they might have any theoretic influence,—would tend during operation to retard the blood current through it into the jugular bulb, and to this extent their influence would be against aspiration.

If we may regard the whole system of intracranial sinuses as a system of communicating compartments,—*i. e*,. as one irregular vessel; and if we will bear in mind the fact that the contained blood is kept in motion chiefly through the agency of pressure from the incoming blood from the cerebral veins, it becomes evident that the blood flow in the various sinuses cannot differ greatly except as it may be influenced by the distribution of these veins.

In physiological experiments intracranial pressure is usually measured by determining the pressure of the cerebro-spinal fluid in the subarachnoid space, or in the ventricles of the brain. This pressure varies in health only with variations in the amount of blood passing through the cerebral arteries. Owing to the physical conditions surrounding the brain,—*i. e.*, brain substance suspended in incompressible cerebro-spinal fluid, the whole being confined in the unyielding bony cavity of the skull,—any dilatation of the cerebral arteries must result in increased pressure upon the cerebro-spinal fluid and also upon the cerebral veins and sinuses. Howell, in his recently published text-book of physiology, states that it has been proved experimentally that the pressure in the subarachnoid space (cerebro-spinal fluid) is always the same as the venous pressure within the sinuses. If we may assume from this that the pressure within the various intra cranial sinuses is uniform, I see no reason why the movements of the blood in these sinuses should not be in accordance with Pascal's physical law,—viz., that pressure exerted upon any given area of a fluid enclosed in a rigid vessel is transmitted

undiminished to every equal area within that vessel, and therefore in all directions. This should tend largely, if not wholly, to eliminate gravity as influencing current rapidity in the venous sinuses of the skull.

To my mind, a question of greater importance in connection with intracranial surgery is the controlling influence which the various intracranial sinuses may exert upon the health of the individual. While this consideration should not deter us from operations necessary to save life, it certainly should weigh heavily against operative procedures for which no positive or clearly defined indications exist.

Dr. Richards says,—"It is not a little surprising that after complete obliteration of the internal jugular, the sigmoid and lateral sinuses of the involved side, no ill results follow which can be attributed to disturbed circulation." But is this wholly or invariably true? Rohrbach has recorded a case in which, after ligating the internal jugular in an operation for removal of a tumor, the patient rapidly became comatose and died from cerebral œdema. Luc has reported a case in which, after ligation of the internal jugular, the patient gradually became drowsy, and died in eight hours, apparently from the same cause. Physiological experiments have shown that a dog may live and apparently thrive after removal of one kidney. But does he live as long? Who is prepared to say that obliteration of one of the large venous channels of the brain may not eventuate in grave sensory disturbances of which the surgeon may never know?—that the compensatory activity of the remaining sinuses and the increased strain upon the cerebral arteries may not give rise to retrograde tissue changes which, though not immediately fatal, may materially shorten, or curtail the usefulness of, the patient's life?

But to return to the original question,—shall we open all sinuses in which we have reason to suspect the existence of a parietal clot? My own convictions,—if they have not already been made clear,—may be stated briefly as follows:

1. In operating upon a patient suffering from acute or chronic mastoiditis, who presents symptoms characteristic of sinus thrombosis (*e. g.*, chills, high remittent temperature, sweats, etc.), the lateral sinus should at once be freely exposed

by removal of the overlying bone for at least three-fourths of an inch. This procedure in competent hands adds absolutely no risks to the operation, and permits an examination of that portion of the sinus nearest the original focus of infection. If the sinus is compressible, and the dura covering it is apparently healthy, one should hesitate before proceeding at once to open the vessel. Its free exposure places the surgeon in a position to act quickly should the further course of the disease so indicate. In many cases the symptoms will subside as a result of removal of all diseased bone.

2. Should symptoms of septic absorption develop in the post-operative period following mastoidectomy, the indications are the same,—*i. e.*, free exposure and careful examination of the sinus. If the sinus is apparently healthy, the question of a further delay should be carefully weighed, and decided only after due consideration of all the data at hand. It is of great importance at this juncture that the patient should be given the advantage of a consultation. Typhoid fever, malaria, pneumonia, tuberculosis and probably other conditions may in exceptional cases give rise to symptoms very similar to those characteristic of sinus thrombosis. Conditions overlooked by the surgeon may be quite patent to the skilled diagnostician whose professional activities cover a larger field. If the symptoms do not subside, there will be time to open the sinus after other causative factors have been excluded. Should a fatal outcome seem in certain cases to argue the penalty of delay, this should be accepted as the tribute which the individual must pay for the safety of the many.

3. In operating upon cases of extensive mastoid necrosis, one not infrequently finds the sinus groove diseased, and the sinus wall thickened and covered with granulations. In the absence of symptoms of sepsis, *this condition should be regarded as a positive contra-indication to opening the sinus. The granulations should not be curetted. The sinus wall should not be subjected to any unnecessary manipulation.* Great care should be observed to remove every vestige of diseased bone, areas of necrosis being followed in whatever directions they may lead. The great majority of these cases recover without any further operative intervention.

REPORT OF THE TRANSACTIONS OF THE NEW YORK OTOLOGICAL SOCIETY.

MEETING OF NOVEMBER 28, 1905. DR. E. B. DENCH, THE PRESIDENT, IN THE CHAIR.

By Dr. ARNOLD KNAPP, Secretary.

Dr. Phillips presented a patient **with closure of a large retro-auricular opening** by the so-called radical operation and a particular meatoplasty. The patient's ear trouble began four years ago, was characterized by rapid extension and at the operation, which was undertaken four days later, considerable disintegration of the bone had occurred. A second operation was necessary in which the zygomatic cells were radically resected and the middle cranial fossa exposed. Notwithstanding a number of small operations, the wound never completely healed. There was a very large hole in the mastoid which was covered by healthy epithelium in its lower half. The radical operation was performed and this lower epidermised portion of the mastoid was left alone. An incision was made along the margin of the opening and the two skin surfaces were then approximated, covering over the large bony cavity. The following meatoplasty was performed. An incision was made along the inferior portion of the entire canal into the concha; this was continuous with a broad circular incision in the concha whereby a circular flap was obtained which was reflected backwards. As far as the author knows, this meatoplasty is the method described by Ballance. He had been in the habit of practising this procedure with perfect satisfaction.

The results seemed to be better from a cosmetic standpoint than in other procedures. The hearing is now very much improved.

Discussion: Dr. BERENS thought it was extremely important in making this flap out of the auricle and membranous canal to remove all unnecessary cartilage so that nothing is exposed.

Dr. MCKERNON thought the case was instructive as showing the variations in the degree of removal of the posterior wall which occurred in the practice of the various operators. He thought that in this case a little more of the posterior wall had been left than was customary.

Dr. DENCH has observed perichondritis in only one case after the radical operation. In this case he had taken particular pains to avoid leaving any of the cartilage exposed and had in fact covered it with a skin flap.

Dr. BRYANT stated that he was at present closing the wounds after the radical operation completely and treating the cases without packing.

Dr. MCKERNON presented a young man who had suffered from **cerebral hernia** after an operation for mastoiditis and sinus thrombosis. The interesting feature was the successful treatment of the cerebral hernia. The entire mastoid region was occupied by a dense scar at about the usual level, and there was a long somewhat keloid-like wound in the neck. the history of the case is as follows: The patient, a man 20 years of age, had suffered from atrophic rhinitis. After having experienced pain in the ear for two days a paracentesis was performed. This was followed by a thin serous discharge, and when Dr. McKernon saw the patient he seemed very ill,—partly unconscious, with a rigid neck, photophobia and rapid pulse. He was groaning and grinding his teeth. The mastoid region was especially tender. An operation was performed on that same night. The i mcroscopic examination of the discharge revealed the diplococcus intracellularis meningitidis. The entire mastoid was found diseased. There was no free pus but considerable watery fluid. The patient remained unconscious for six days. On the seventh day he partly awoke from his unconsciousness and answered questions. The pupils

were unequal. He then relapsed into coma until the ninth day. He was then better but complained of headache. He gradually improved up to the fourteenth day, except that his temperature remained up to 103°—it then went up to 106°, and on the following day was 105°. Permission was given to operate again and the sinus was exposed. It was found of a pale, grayish color and contained a firmly organized clot which extended back to the torcular. In the neighborhood of the bulb the sinus contained a dark fluid composed of blood and pus. There was no return bleeding from the bulb, but pus continued to ooze out. The jugular was then resected after the ligature had been passed as low down in the neck as possible. The entire jugular and its branches seemed gangrenous. The dissection was extremely difficult, and a number of glands were removed. The wound in the neck was then sutured. Examination of the glands and the walls of the vein showed them to be infected with the same bacterium. After two days the temperature fell and convalescence progressed uninterruptedly, except for a hernia which occurred n the region of the sigmoid sinus. It was so large that it completely filled the wound and rapidly increased in size. It was first painted with silver nitrate without any favorable result. The surface was then sterilized as carefully as possible with salt solution and painted with flexible collodion; this was repeated about 12 times with a steady decrease in size. This treatment was most successful and at present there is no protrusion.

Discussion: Dr. GRUENING reported upon a cerebral hernia which he had also succeeded in successfully treating with collodion.

Dr. ARNOLD KNAPP thought that the unusual duration of the coma was of especial interest in this case, and asked Dr. McKernon whether he thought it was due to an interference with the cerebral circulation or to pressure.

Dr. MCKERNON replied that the case had been observed by a number of general physicians who regarded it as a case of typical cerebrospinal meningitis. A lumbar puncture was made and turbid cerebrospinal fluid obtained. The puncture was repeated twice.

To Dr. BERENS' question what effect the puncture had upon the coma, the reply was, none whatever.

DR. PHILLIPS asked whether the speaker regarded it as a case of serous or purulent meningitis.

Dr. MCKERNON thought it was probably a case of serous meningitis.

Dr. GRUENING stated that he saw no reason why cerebro-spinal meningitis could not be combined with mastoiditis in the same patient.

Dr. KENEFICK asked Dr. McKernon in what way he had treated the wound in the neck?

Dr. MCKERRON replied that he had followed his usual procedure, viz., of suturing the wound and of introducing a drain at the angle of the jaw, a wet dressing being then applied. At each change of dressing the drain is shortened.

Dr. GRUENING thought that the result of the wound in the neck was not at all a favorable one. He would call the condition a keloid. The wound looked as if it had been healed by granulation.

Dr. MCKERNON replied that this appearance of the wound was observed six weeks after the operation and that the scar had been steadily increasing. He thought it might possibly have been due to the fact that the tissues were all so affected.

Dr. PHILLIPS presented a **specimen of a temporal bone with an anomaly** in the floor of the middle fossa and a displaced sinus, showing that an operation performed in the usual site, viz., the mastoid fossa, would on the one hand have entered the middle cranial fossa, and if the opening had been made slightly further back the sinus would have been encountered.

Dr. BERENS stated that he had exhibited to the Society several years ago, a lateral sinus which was displaced forwards and upwards so that its anterior border was covered by the suprameatal spine, the sinus thereby intervening between the cortex of the mastoid and the antrum.

Dr. TOEPLITZ reported a case in which he had encountered the sinus at the first stroke of the chisel.

Dr. GRUENING thought that it was not unusual to find the

sinus displaced forwards. He now always opens the mastoid process lower down, whereby by working up the sinus can always be avoided. He thought that this method was better than the Stacke. The antrum could frequently be entered from the posterior and the lower side of the sinus.

Dr. BERENS thought that the practice of invariably exposing the antrum first should be abandoned.

Dr. DUEL, however, did not think that this was necessarily such a bad practice, but that as a general rule it worked very well if the cortex is taken off carefully; it was very much more simple to enter the antrum first and it was comparatively easy to avoid injuring the sinus.

Dr. GRUENING made the following historical references to his original publication in which he advocated removing the tip. He was then wrongly understood and accused of not entering the antrum. This he, however, never failed to do, and it seemed to him immaterial whether the antrum was opened first or last.

Dr. ARNOLD KNAPP presented a **specimen of a purulent thrombosis of the cavernous sinus and osteomyelitis of the petrous pyramid** in a diabetic patient. The malady began by an acute purulent otitis. The patient subsequently was treated for neuralgia until the right eye became unusually prominent. Two days later the left eye also protruded. The patient's general condition grew very much worse, he was semistuporous and after four days in the hospital died. The condition at no time permitted any operation beyond a paracentesis. The autopsy revealed an osteomyelitis at the apex of the petrous pyramid, perforation of the temporal bone, and a large abscess situated on the anterior surface of the petrous pyramid near the apex underneath the dura. This extended anteriorly to the region of the right cavernous sinus. There was also some pus in the left cavernous sinus. The case will be reported in full. It is interesting to observe in this patient that the site of the abscess near the apex of the petrous pyramid was directly underneath the Gasserian ganglion, which explained the neuralgia.

Dr. GRUENING inquired whether the patient presented the

signs of herpes. He had observed that mastoiditis when complicated with herpes was always fatal. He had seen three cases. Of course herpes occurs with cerebrospinal meningitis also in cases which recover.

The answer was No.

Dr. BACON reported on the case of **head injury followed by ear symptoms.** A student at Princeton had fallen one week before he saw him, striking his head above the auricle. There was hemorrhage from the ear. After one week he was allowed up, then complained of ear-ache. There was a profuse serous discharge with some temperature. The mastoid was found very tender, and an operation was undertaken a few days later Before the operation the discharge from the ear had become purulent. The mastoid condition at operation was not unusual. The fluid found in the mastoid contained pneumococci and streptococci. He thought the condition was interesting because it was evidently not one following fracture of the base of the skull though it simulated this condition and that probably the infection occurred, as is usual, from the nasopharynx.

Dr. KENEFICK inquired whether after the injury to the head the canal was packed with gauze. He had seen a large number of injuries to the bony canal and had found that it was much the best practice to do nothing.

Dr. KENEFICK reported the case of a child two and a half years old who presented a swelling behind the ear. A subperiosteal abscess was found and the underlying cortex was softened. The unusual feature of the case was that there were absolutely no symptoms in the canal, no sagging of the superior wall, and that the drum membrane was normal. Nor was there any history of preceding ear trouble or infectious disease.

Dr. MCKERNON inquired whether the tympanum was exposed at the operation.

Dr. KENEFICK replied No, that he did not think it was necessary inasmuch as he had obtained drainage posteriorly.

Dr. GRUENING said that cases of mastoiditis without middle ear symptoms are, of course, very rare. A diseased gland on the surface of the mastoid might secondarily involve the bone and so cause a secondary mastoiditis without any otitis media.

Dr. BACON had observed a similar case within the last two years in the Infirmary, in which also no change had been found in the drum membrane.

Dr. SHEPPARD thought that very likely the previous ear trouble had been forgotten because it got well quickly.

Dr. BRYANT stated that within the last summer he had seen a somewhat similar condition but upon close examination he elicited the information that there had been an acute inflammation two months previously without perforation of the drum.

Dr. LEWIS spoke of a case of double mastoiditis where the only symptoms in the middle ear had been a yellowish appearance of the drum. Operation was undertaken because the temperature was high, the hearing affected and tinnitus was complained of,

Dr. GRUENING related a case of **sinus thrombosis** in a boy twelve years of age. He had vomited, had had a chill, and his temperature was 103°, with a history of an old otorrhœa. Microscopic examination of the pus was negative. The patient seemed very ill, and after an observation of one day his temperature rose to 105°. Both mastoid processes were opened and found diseased. The sinus on the right side was exposed and presented a white spot. The left sinus was normal. After the operation the temperature was 101°, three days later it rose to 105°. On examining the eyes, the right one was found normal, in the left there was a distinct venous congestion of the disk. Both sinuses were then opened and bled profusely. The temperature was 100° and 104° on the next day. Optic neuritis was distinct in the left eye, the right normal. It was then decided to open the left sinus, and a very extensive clot was removed. No bleeding was obtained from below, so that the jugular and the facial veins were ligated. On cutting the vein only a thin stream of blood appeared. The pulse was very rapid. The condition of the patient was so bad that the operation could not be prolonged. A thin piece of gauze was inserted in the upper knee, and on withdrawing this a clot followed and free hemorrhage. The temperature remained at 105° for three days, then gradually came

down, with two periods of elevation. The case presented the two following interesting features:

1. The right sinus was the one which showed changes, at the same time the left was the one which was opened apparently correctly because the left optic nerve showed ophthalmoscopic changes.

2. The successful attempt to remove a clot by the insertion of gauze in the sinus.

Dr. GRUENING also reported upon two cases of **otitis and mastoiditis occurring in typhoid fever.** In the first case the ear symptoms came on in the third week of the fever. The temperature had been 100°–103°, then it rose to 105°, at which it remained. The ears were examined and an otitis media found present. A paracentesis was performed. The temperature continued, and, as other causes could be excluded, the mastoid operation was performed. The cells were found filled with a serous fluid, the bone was very hard, no bacteria in this fluid. The patient recovered.

The second case was one of a double suppurating parotitis occurring in typhoid fever. The abscesses had been incised by a general surgeon, who had made a crucial incision, a vertical one through the skin and the incision into the gland in a direction at right angles. The right parotid had perforated into the right auditory canal so that a view of the drum was obscured. There was considerable swelling and tenderness over the mastoid. The mastoid was opened but found normal.

Dr. BRYANT spoke of a **modified radical operation** which he had recently performed upon a patient who had suffered from an acute exacerbation of a chronic purulent otitis. The ossicles and the annulus were left. The case healed unusually quickly and the hearing result was very good.

Dr. DUEL related the history of a girl of six who had developed **a knee-joint metastasis after mastoiditis,** who, however, **recovered without any operation on the sinus.** The patient gave a history of repeated attacks of pain in the ear without otorrhœa. On admission to the hospital she had suffered from pain in both ears for five days, and the left ear had then begun to discharge profusely. The right drum was

found bulging, in the left a very small perforation was present. The left antrum and tip very tender, the right slightly so. She had had some fever and was very restless. A double paracentesis was performed, and on the next day there was less tenderness over the right mastoid process. The left mastoid was opened and the sinus was exposed for one inch. It seemed to be externally perfectly healthy. The temperature then varied between 99° and 102°, making two daily excursions. There was no pain or tenderness in the right mastoid. Four days later the left knee became painful and swollen. The joint became distended. The question now arose whether this condition, which evidently was metastatic, necessitated an operation on the sinus. The right ear had ceased to discharge. Dr. Duel did not operate because the child had had no chill, the general condition was excellent and the fever was not high. The temperature varied for several days, after one week the knee was very much better, and in two weeks the child was running about the ward.

Dr. BACON thought that the temperature was not high enough to indicate a sinus involvement.

REPORT OF THE TRANSACTIONS OF THE SECTION ON OTOLOGY, NEW YORK ACADEMY OF MEDICINE.

MEETING OF NOVEMBER 9, 1905. DR. GRUENING IN THE CHAIR.

Extra-dural abscess with obliterating sigmoid sinus phlebitis. By L. M. HURD, M. D.

A. T., aged twenty-seven, married, metal worker; admitted to Dr. Clemens' service at the Manhattan Eye and Ear Hospital, August 8, 1905. Diagnosis, Mastoiditis with Sinus complications, of four months duration. History: Good health up to four months ago; at that time he began to have pain in his right ear, which continued with considerable severity for three days; he then had his drum membrane incised, which was followed by a profuse discharge and relief of pain. About every fourth to seventh day thereafter the discharge became scanty, followed by intense pain in the right side of head, with nausea, constipation, vertigo, chills, fever, and sweats. For the six weeks previous to operation he had pain in the mastoid process and temple, with shooting pains running over the parietal region.

Condition on admission: Discharge slight, drum membrane and supero-posterior wall markedly bulging. Perforation in lower posterior quadrant. Some tenderness of the antrum; none over the tip. Temperature and pulse normal. Operation. Usual curved incision, augmented by a posterior incision at right angles; also a short cut upward toward the parietal region. The cortex normal, unusually thick and hard; the whole cellular structure was necrotic. The antrum was small and located above the canal; the necrosis and granulations

extended upward and backward, above the lateral sinus, in which locality an extra-dural abscess was found, about one and a half inches in diameter, containing a small amount of pus. The dura was covered with exuberant purplish granulations; these granulations did not extend on to the sinus wall. The sinus did not pulsate and the walls felt thick and boardlike. On incision the wall was found to be about four times the normal thickness. The intima looked normal with no evidence of a thrombus; the thickness of the sinus wall so diminished the calibre of the vessel as to prevent the flow of blood. The interior of the sinus was dry except for a slight flow from the superior petrosal sinus. The sinus was incised from the knee about one inch in either direction, at which point the flow of blood was established. There was no evidence of a thrombus.

The subsequent history was entirely uneventful. The interesting point in this case is: Nature's method of preventing general infection through the circulation by occluding the sigmoid sinus, and if the case had not been complicated by the extra-dural abscess it probably would not have come under our observation, and ultimately it would have become a chronic discharging ear with the sinus degenerating into a fibrous chord.

A case of destruction of the cellular portion of the mastoid process: the enucleation observed followed closely the lines of the modern radical operation. By L. M. Hurd, M. D.

Nine years ago this patient had a severe attack of scarlet fever, with a bad throat and enlarged glands. After the scarlet fever both ears ran and the mastoid processes became involved, and bone on both sides was taken out. On the left side, through an opening in the mastoid cortex, the facial canal and semicircular canal can be seen. The other ear is in practically the same condition, but is healed up. The patient's throat is typical of tertiary syphilis. There is a perforation of the right side of the velum, and portions of the epiglottis have been destroyed. Dr. Hurd said that at first he was sure that the case was syphilitic, either acquired or congenital, but as he could find no symptoms or history confirming either, he was

compelled to believe that the condition resulted from scarlet fever. He found twenty-one cases of this character on record. The auditory nerve was perfectly normal.

Case of infective sigmoid sinus thrombosis and jugular vein infection of otitic origin without mastoid involvement. By J. D. RICHARDS, M. D.

Negro, male, age nineteen. Previous history negative. About a year and a half ago he had an attack of acute otitis media in the left ear, following grippe. There was a mild earache followed in twelve hours by a sero-purulent discharge and relief of pain. The drum membrane was slightly reddened but at no time bulged. The discharge gradually diminished and ceased on the fourth day. During this attack there were no mastoid symptoms.

On the morning of the fifth day the patient awoke with complete facial paralysis, which continued until the fourteenth day, when he was first seen by Dr. Richards. Examination showed the paralysis to be peripheral; no mastoid symptoms; temperature, respiration and pulse normal; eyes negative; cerebration clear; auditory canal dry; membrana tympani not reddened, though it had lost its lustre and showed evidence of having been recently inflamed. The manubrial plexus was slightly injected. For several days previous the patient had complained of constant headache, varying in intensity. Excepting for this he had felt well and had continued at his work.

Acute suppurative otitis, no myringotomy having been performed, followed by facial paralysis, and headache localized on the involved side, roused suspicion, and the drum membrane was incised, but was found to be perfectly dry. Suction with pneumatic speculum revealed nothing. The ear was then dressed and the patient sent to the hospital for observation. On the following day he was seized with a hard chill; temperature rose rapidly to 103.2° F., and suddenly remitted followed by profuse sweat. During the height of the fever the pulse rate fell from 88 to 62 per minute.

In the absence of other conditions to account for these symptoms the mastoid was explored. The bone was sclerotic,

the sinus lay superficial and far forward, the knee being practically in contact with the posterior canal wall, the major superior portion of which was removed in order to get into the antrum. The cavity was small and dry and contained a few firm red granulations, evidently the result of the previous inflammatory process. The sigmoid sinus was then exposed from beyond the knee well down toward the bulb. The middle of the vertical sinus limb descended through a patch of purulent dura. Upon palpation, the vessel was resilient, and from the physical signs alone the presence of a thrombus could not be determined. The vein was opened upon the symptoms and an apparently recent obstructing thrombus found. Free return flows from either end were obtained. Apparently healthy vessel wall was reached on both proximal and distal ends, and the diseased external vessel wall was exsected. The patient was returned to bed and for a few days the condition was satisfactory, though on each afternoon there was a slight rise of temperature.

Four days after the operation the patient had a chill followed by a temperature of 104° F., suceeded by sweat. The internal jugular vein was then resected, but to the naked eye it appeared normal and contained no clot. The walls of the upper portion of the vein were invaded by large numbers of streptococci. The coagulum later found in the vein was a post-operative coagulum and was microscopically negative. A bent ring curette was inserted into the bulb end of the sinus and return flow established; and a gauze wick was introduced into the proximal end and carried well down toward the bulb.

From this time there was no further rise of temperature, the facial paralysis gradually disappeared, and the further history of the case was uneventful.

The points of interest in this case were the following:

1. During the course of an apparently mild middle ear infection septic products are transmitted to and deposited in the sinus wall in the vicinity of the knee; infective thrombosis develops and advances insidiously, and manifests itself eleven days after the subsidence of the middle ear inflammation.

2. The case illustrates the fact that it is safer to enter the mastoid over the tip than over the antrum. Injury to the sinus would have been inevitable had the attempt been made to enter the antrum as the primary step of the operation.

3. That we cannot always from the physical signs alone determine the presence of a completely obstructing clot.

4. Though we succeed in passing with the incision the upper and lower limits of thrombus and get free returns from both ends of the vessel, we sometimes fail to pass the limits of bacterial invasion, and that this limit cannot be determined by the naked eye.

5. The good effect of a timely jugular resection.

6. The difficulty of obliterating the cavity of the jugular bulb by a protective coagulum.

7. The good effect of introducing a strip of gauze into the proximal end of the sinus and carrying it well down toward the bulb if not into that cavity.

8. That when we have infective sigmoid sinus thrombosis without apparent involvement of the mastoid we should not hasten to conclude that the route of infection is through the tympanic floor. In this instance had operation been delayed for twenty-four or forty-eight hours the thrombosis might have extended down into the bulb, and it might have been inferred, though wrongly, that it was a case of primary jugular bulb thrombosis.

Report of a case of serous meningitis. By ARNOLD KNAPP, M. D.

(Published in full on page 6 of this number.)

Discussion: Dr. DENCH inquired how deep was the incision of the cerebellum when the fluid was evacuated.

Dr. KNAPP replied that the cerebro-spinal fluid came out as soon as the dura was incised. The upper incision did not reveal any cerebro-spinal fluid. It was punctured directly in front of the cerebellum.

Dr. RICHARDS inquired if there was a sudden fall of temperature following the lumbar puncture in the second case.

Dr. KNAPP replied that the temperature did not fall for two or three days. The lumbar puncture did not seem to have

any effect on the course of the disease but simply aided in the diagnosis.

Some observations in the ear clinics of Berlin, during the summer of 1905. By C. H. MAY, M. D.

Dr. MAY said that he saw very little in Berlin that he had not previously seen in New York. The Berlin aurists were extremely courteous and afforded him all facilities for observing everything, and thus he saw much in a very short time. He had spent most of his time in Jansen's Clinic, being present from 7 to 10:30 A. M.; then taking in one or two eye clinics, he could visit Lucae's Clinic from twelve to two o'clock. He spent a part of each afternoon at the Anatomical Institute, and found the work here both instructive and interesting; there was an abundance of material and specimens of dissections of various parts of the body. He had been interested in making some dissections of the facial nerve; he had no difficulty in making arrangements for the exclusive attention and help of one of the assistants for an hour or two every day; this, with the large amount of material at disposal, enabled him to spend his time there very profitably; he doubted very much whether anyone could obtain such facilities for this particular study in New York.

Regarding the work done in the Clinics, this was very much like what is seen in New York; but a few points were worthy of mention. Jansen was particularly courteous, and would, at any hour of the day or night, send notices of operations to those who were interested, and give every opportunity to see operations and follow up the cases afterward. He is a particularly fine operator and handled the chisel and mallet with unsurpassed ease and dexterity, exposing the desired region with wonderful skill and rapidity. In Berlin, chisels (Lucae's or some modification of these) are used in mastoid operations almost exclusively, the bone forceps and curette being employed much less extensively than in this country. There seemed to be a greater tendency to close mastoid wounds; in Jansen's Clinic, metal sutures (Michel's) were used for this purpose; Dr. May had seen these used before in general surgical cases, but not in mastoid wounds. The sutures consist of small, curved,

flattened metal wires with pointed extremities; they are applied with a special form of forceps, left in place for several days, and then removed with little hooks; the sutures may be used repeatedly. Dr. May said that he had not tried these sutures; they were supposed to prevent the occurrence of stitch abscesses, but he could not see that they offered any advantage over thoroughly sterilized silk sutures.

In Berlin the forehead mirror in common use is supplied with an attachment by means of which the mirror can be supported by the teeth; this removes the annoying band around the forehead. He had brought one over and had tried it in office work, but he did not like it; it did not seem cleanly. In operating, however, it might prove of advantage. An attachment to the edge of the mirror, capable of being sterilized, and permitting the operator to touch the sterilized portion in shifting the position of the mirror, seemed a good addition when reflected light has to be employed in ear operations.

The method of giving ether in Berlin clinics is peculiar; the anæsthetic is poured into a rubber bag about a foot long, having a diameter of three to four inches; this makes it necessary to take off the mask from time to time and allow the patient to breathe air. One misses seeing the Bennett inhaler, but the results seem satisfactory. In Jansen's Clinic one of the attendants had charge of the anæsthesia. Gas is seldom used and children are rarely anæsthetized for the removal of adenoids.

The instruments which formerly seemed clumsy and heavy to those used to American models, have been improved very much of late and are now as delicate and graceful as the models turned out in this country. Since instruments are subject to a heavy duty, even when brought in by the physician himself, there is no advantage in buying them abroad.

Dr. May thought very highly of the Nernst lamp for throat, nose and ear work; he had seen it in Fränkel's Clinic and elsewhere in Beriln; its adaption for furnishing light in such work gave a remarkably satisfactory illumination—solid, white and powerful. This lamp can be operated with the street

current, without rheostat; the luminous portion consists of a network of wires covered with some white material which is made incandescent by the electric current. The doctor uses such a lamp in his office and it gives satisfaction. But, unfortunately, all the renewals have to be imported, for although the Nernst lamp is used extensively in factories in this country, it has not yet been supplied in a form to permit small lamps to be employed with the voltage in common use. The lamp is about 50 candle power and is mounted in a Hirschmann model stand, which renders the rays parallel and permits them to be thrown in any direction.

THE BLOOD SUPPLY OF THE INTERNAL EAR WITH DEMONSTRATIONS SHOWING ITS PRACTICAL USEFULNESS IN OTOLOGY.

By GEORGE E. SHAMBAUGH, M. D., Chicago.

(Published on page 11 of this number.)

REPORT ON THE PROGRESS IN OTOLOGY DURING THE FIRST QUARTER OF THE YEAR 1905.

By Dr. ARTHUR HARTMANN.

Translated by Dr. Arnold Knapp.

ANATOMY AND PHYSIOLOGY.

1. Vernieuwe. **Preliminary note on the histogenesis and structure of the habenula sulcata.** *La Presse otolaryngologique Belge*, 1905, Book I.

2. Kobylinski. **The carotid canal and the bulb of the jugular vein in practical otology.** *Vortrag, gehalten in der St. Petersburger Otolaryngologischen Gesellschaft am 6*, November, 1904.

3. Ballowitz. **The olfactory cells of the river lamprey.** *Arch. f. mikrosk. Anat. u. Entwicklungsgesch*, vol. 65, pp. 78–95.

4. Poli. **On the distribution of adenoid tissues in the nasal mucosa.** *Arch. internat. d'otologie*, etc., vol. xix, p. 132.

5. Tsakyroglous. **A case of lagorrhinos.** *M. f. O.*, 1905, No. 2.

6. Lucæ. **On the nature and perception of sounds.** *Arch. f. Anat. u. Physiol. Physiolog. Abteilung, Suppl.* 1904, pp. 397–408.

7. Urbantschitsch. **On the influence of colored perception on the sensory functions.** *Bonn 1904, Arch. f. ges. Phys.*

8. Flechsig. **Investigation on the brain.** *Reports of the Mathematico-Physical Class of the Royal Saxon Society of Sciences at Leipsic*, January 11, 1904.

9. Hastings. **A report of two hundred and eighty-one mastoid operations.** *Amer. Journ. Med. Sciences*, January, 1905.

1. The author has endeavored to study the structure of the habenula sulcata by way of its embryologic development. White mice were examined, and he comes to the following conclusions: The epithelium lining the primitive cochlear canal is represented on the surface of the habenula sulcata of the fully grown animal by a row of nuclei which are surrounded by a pale cytoblastic zone and are separated from each other by connective tissue. The supporting framework of the habenula sulcata is a transformed connective

tissue which is derived from the young intracapsular connective tissue which surrounds the cochlear canal. The tissue of the habenula sulcata is not distinctly separated from the underlying tissue of the bony spiral lamina which proves their common embryologic origin. The tissues of the habenula sulcata are continuous with those of the spiral lamina. There are six drawings.

BRANDT.

2. This is a report of two cases with interesting anomalies in the course of the venous vessels in the external canal this side of the drum membrane. In the first case, which was observed in the Clinic of Professor Stimanowski, the jugular bulb protruded into the bony part of the left auditory canal 8 *mm* in length and 6 *mm* in height and covered the lower quadrant of the drum membrane. A similar, though not so pronounced a case was described by Professor Gruber. In this case the jugular bulb protruded into the bony part of the right auditory canal, 6–7 *mm* in length and 3–4 *mm* in height. Professor Gruber considers this anomaly to be very rare and as yet unpublished. The second case was a private patient of the same physician who presented a pronounced thick bulbular vessel which, beginning at the upper bony wall of the canal, passed along the stria vascularis to the drum membrane, then disappeared along the posterior border of the manubrium of the hammer, gradually becoming thinner and disappearing in the upper quadrant. Both cases are illustrated. SACHER.

3. Our knowledge of the olfactory cells of the lamprey is not complete. Retzius was not able to satisfactorily describe the morphology of the central and peripheric ends of the cells, and Pogojeff has reported findings which oppose those previously published. The author shows, with the aid of illustrations, that the olfactory cells carry cilia which, with great probability, vibrate. The ciliated extremities of the olfactory cells protrude over the level of the surrounding framework and project out of a network which is surrounded by supporting cells and the heads of olfactory cells. The central cellular network passes into a narrow thread which shows varicose dilatations and does not always enter perpendicularly into the basal epithelium, but frequently turns and runs parallel to the basal surface and thus joins an olfactory fibre.

ESCHWEILER.

4. The author examined the adenoid tissue of the nasal mucous membrane in a variety of vertebrates and in human subjects of every age. In the fully-developed fœtus of man and animals there is no adenoid tissue. This is, however, present in the new-born animal and increases with age. In advanced age there is a distinct difference in the development of the adenoid tissue in man and in animals. In animals it is sparse; adult human subjects are rich in adenoid tissue which is collected in places in follicles which may penetrate between the epithelium. It is especially the lower and middle turbinals that present an area of adenoid tissue in the mucous membrane. OPPIKOFER.

5. Lagorrhinos, according to the author, is a deformity which he observed in a man fifty years of age, and consisted in the fact that both nasal alæ, beginning at the tip of the nose, were separated by a fissure one *cm.* long, and that from the tip of the nose two diverging round ridges began which extended to the middle of the forehead. On each side directly over the eyebrows there was a smaller ridge. All four ridges were bony. The septum was normal, the terminals were rudimentary. PIFFL.

6. The author distinguishes between two groups of noises, the musical ones which to a certain extent form the transition from sounds to the pure noises, and the specific ones. The latter are characterized by their lack of color which is caused by the fundamental tone as masked by the many associated tones. In some cases the individual components of the noise are uniformly distributed, in others there is a steady change in the predominant tone. A noise grows more colorless as it becomes more difficult to determine its pitch or its fundamental tone. The characteristic feature is that the fundamental tone varies with the distance from the source of sound, which becomes higher in pitch on approaching, deeper on going away. This condition is explained because the high tones, on account of their greater physiologic intensity, produce a stronger impression, while the deeper tones possess a larger physical energy which more easily overcomes obstructions. With increasing distance from the source of sound the action of the tensor tympani and the resonance of the external auditory canal become gradually less, and the fundamental tone of the middle ear becomes more pronounced. The author deduces this fact from his well-known experiments on the resonance of the external middle ear

which are again reported. The perception of musical sounds, according to the author, takes place in the cochlea. The specific sounds, he believes, require a particular organ of the labyrinth.

SCHAEFER.

7. Urbantschitsch reports on the continuation of his interesting examinations and describes the influence of colored perceptions on audition (increase or diminution of hearing acuity, changing of the pitch and disturbance of the local sensation in the ear production of subjective noises), moreover the influence of colored perception on imaginary movements and disturbances of equilibrium, on the senses of taste, smell and temperature. BRÜHL.

8. The work represents the study of serial sections of fifty-six human brains between the stage when myelinization first begins, four months after birth, and at the time when every portion of the cortex shows some medullated fibres and the main paths are laid down, namely, four months after birth. FLECHSIG divides the cortex into thirty-six areas, of which the first twelve are myelinized before birth, and the rest after birth. The first areas in the cortex to become medullated are primary sensory areas representing smell, touch and muscle sense, sight, hearing and taste. The next group of centers have at first only fibers between themselves and are called automatic centers of unknown meaning. The rest of the areas have association bands and its earlier zones develop as a marginal zone around the primary sensory areas and receive short fibers from them; they are undoubtedly connected with the sensory areas in function. The last three zones develop long association bands first and are the great association centers. The first fibers to medullate in the brain are the primary sensory paths which extend from lower centers to the cortex. There are seven areas on the cortex corresponding with the numbers 1, 2, 4, 5, 6, 7 and 8, 1 and 4 are primary olfactory areas connected by a band of medullated fibers with the olfactory bulb; 7 is for hearing and has its subcenter in the medial geniculate body, while 6 is possibly the primary sense area for taste and has its subcenter in the thalamus and globus pallidus. The olfactory area has the fewest layers corresponding with the simple olfactory mucous membrane, while the island of cells in the subiculum cornu Ammonis correspond with the taste buds. The cortex of the area for hearing is twice as thick as in the rest of the gyrus. Each area is to be considered as a repetition

in the cortex of a peripheral sense organ. The first portion of the cortex to become medullated is the lamina perforata anterior receiving fibers from the olfactory bulb; later the olfactory fibers extend to the uncus. The olfactory system, which lies in the hippocampal zone, is the first to develop association bands. The great sensory area representing touch and muscle sense begins to medullate next after the olfactory area. The structure of the cortex of this zone is less characteristic than the areas of special sense. In contrast with the areas for smell, sight and hearing, the central sensory area develops motor fibers after the sensory ones. The cortical zone 6 may represent taste. It receives fibers from the thalamus in part, near the pulvinar. FLECHSIG thinks that taste is also represented in the central sensory area. The fibers for hearing are the first to become medullated in the temporal lobe. These fibers come from the medial geniculate body and end in a small portion of the gyrus temporalis I., not more than 1 to 2 *cm.* in area. FLECHSIG points out the enormous amount of work to be done in following the further development of the paths in the brain.

M. TOEPLITZ.

GENERAL.

a.—PATHOLOGY AND SYMPTOMATOLOGY.

9. HASTINGS. **A report of two hundred and eighty-one mastoid operations.** *Amer. Jour. Med. Science*, January, 1905.

10. HAMMERSCHLAG. **On the heredity of otosclerosis.** *Wiener klin. Rundschau*, No. 1, 1905.

11. BARTH. **On bilateral facial paralysis.** *Deutsche Med. Wochenschr.* No. 4, 1905.

12. POLLAK. **On coughing.** *M. f. O.*, 1904, No. 12.

9. The data are collected from 281 consecutive mastoid operations performed at the N. Y. Eye and Ear Infirmary during the year 1903. 447, one-fifth of all hospital patients with acute or chronic otitis media were children, 19 were infants. The mastoid pus of 69 cases examined contained streptococci in 50%, pneumococci in 29%. Mastoid swelling was found in 100 out of 447 cases; in 72 of these (56 were children) subperiosteal pus was found on operating. In the remaining 28 of swelling there was œdema with pus within mastoid. Tenderness existed in 84 over antrum and tip, in 3 over antrum only, in 8 solely at the tip, here in 2 with Bezold perforation. 37 of 281 cases had post-auricular fistulæ, 7 due to subperiosteal abscesses, 30 from former unsuccessful mastoid operation (15

Eye and Ear Infirmary cases), 7 being children. In 7 cases previously operated abscesses developed under the old scar. In 4 cases otorrhœa had continued in 1 for one year, in 2 for three years, in the 4th for eight years. There were two cases of acute and subacute mastoiditis respectively, with normal drum membranes. More than one-half had on admission less than 100 °F. Of the 167 cases not operated upon, but treated by paracentesis, irrigations, ice coil, leeches, six returned after discharge from hospital and were all operated for extensive mastoid destruction; 1 with perisinuous abscess, 1 with Bezold perforation, all adults with outer table hard and thick. Of the 281 operations, 164 were for acute mastoiditis, 44 radical operations for chronic mastoiditis, 25 were radicals secondary to former unsuccessful mastoid operations, and 48 radicals primarily performed for the cure of chronic purulent otitis only (only 3 ossiculectomies). Pus was subperiosteal in 72, in mastoid cells in 82, in tip cells in 24, in antrum in 27 cases; congested cells in 2 cases; cholesteatoma in 20 chronic cases. The lateral sinus was displaced forward in 28 sclerotic mastoids. Pain was relieved by operation in 9 sclerotic mastoids. The dura was uncovered in 44 acute and 45 radical operations; in 2 infants with subperiosteal abscess meningitis and death followed. The uncovered lateral sinus was found normal in 69 operations; it was accidentally opened in 9, in 1 followed by thrombosis and death, purposely opened in 11 cases, in 9 with thrombosis. One died after the radical, 2 infants from meningitis; of the remaining 6 cases, 2 died of septic pneumonia and leptomeningitis respectively, the other 4 with a clot still without septic disintegration, recovered. Epidural abscesses were found in 21, perisinuous in 46 cases; Bezold perforation in 7. Facial twitch- took place in 1 operation for acute mastoiditis whilst removing the tip, and in 21 radical operations. Of 90 acute mastoids 60 completely recovered; in 7 discharge persisted, 9 died; of the remaining 14 mastoids not healed 9 were re-operated. In the recoveries the average time of healing was 67 days, the hearing fully restored in 54 cases. Of 14 failures 11 were infants. Of 9 deaths 5 were from meningitis, 1 from sinus thrombosis, 1 from chloroform, 1 from diabetic coma and 1 from an unknown cause. Facial paralysis was 5 times a symptom in 164 acute middle otitis. It was brought on by operation in 6 cases; persisted in 3 infants, disappeared in 3. The results of 117 radical operations were personally known in 66: 26 perfect, 20 progressing to good, 2 failures, 8 deaths. The average

time of healing was in 22 cases, three months and seven days, skin grafting shortening the time. Facial paralysis followed the radical operation in 20 of 117 cases: in 4 it was complete and persisting, 10 recovered or improved, 6 were lost track of, in 8 it appeared later after the 3d to the 8th day; the latter gave a more favorable prognosis. Of 6 cases of paralysis before operation, necrosis of the Fallopian canal was found, the other 3 had resulted from operations elsewhere. Skin grafting was made in 37 radicals, in 27 on its completion, in 10 at a second operation, in 9 with perfect result, in 14 the grafts took partially, in 6 they failed to take, in 8 the results were not observed. Death took place after the radical in 8 out of 117 cases: 1 suddenly on the operating table from ether, 1 from leptomeningitis, 3 from thrombosis of the lateral sinus, 3 from meningitis. Total mortality, 17 (6.5%). M. TOEPLITZ.

10. Two family trees are given in which otosclerosis was hereditary. Unfortunately in each only one member was examined who suffered from otosclerosis, and in the second case it is not absolutely sure whether the condition was sclerosis.

The history shows that the disease always originated from the female side, the great-grandmother; in one case after childbirth. It is noticeable that a deaf man in the second generation married his deaf niece, and all of their children were deaf. The family trees show that the children in general had normal hearing.

WANNER.

11. Bilateral peripheric facial paralysis is relatively unusual, and rarely caused by ear diseases but as opposed to the one-sided diseases, it is especially characteristic and unpleasant for the patient. In the monolateral facial paralysis the healthy facial to a certain degree acts in a compensating manner on account of the disturbed movements of mastication and the pronounced disturbance of speech, the disturbance of the lip sounds, impure formation of vowels, and the movements of the jaws during speaking to compensate for the insufficient tension of the lips. NOLTENIUS.

12. The arthur describes first of all our knowledge of the reflex cough produced from the auditory canal and finds that this phenomenon can be produced in about 22% of the cases, and explains the anatomical conditions which cause the ear cough. Two cases are described in which a cough was produced by impact with the tympanic mucous membrane. In another case on touching the pos-

terior lower walls of the labyrinth the sensation of tickling and scratching was produced in the neck. Urbantschitsch has described a similar case to the last produced by an irritation transmitted from the tympanic plexus to the glossopharyngeal nerve. The author in his case believes that a simultaneous excitation of the glossopharyngeal and of the trigeminal nerves was produced, and that it consisted in a heterogeneous nervous cough. PIFFL.

(*b.*)—METHODS OF EXAMINATION AND TREATMENT.

13. HINSBERG. **Examination of the ear.** *Sep.-Abdr. aus Lehrbuch der klin. Untersuchungsmethoden von Prof. Eulenburg, Kolle, Weintraud.*

14. HAMMERSCHLAG. **On the diagnosis of the functional diseases of the sound-perceiving apparatus.** *Wiener allg. med. Zeitung*, xlix, 45–46.

15. SONDERMANN. **On suction treatment of ear diseases.** *A. f. O.*, vol. 64, p. 15.

16. SONDERMANN. **A new apparatus for massage of the ear.** *A. f. O.*, vol. 64, p. 22.

17. SZENES. **In what way can we act against the apparatuses advertised to cure all deafness?** *A. f. O.*, vol. 63, p. 254.

18. HÖLSCHER. **On paraffin in aural surgery.** *Med Korresp.-Bl. d. Württemb. ärztl. Landesver.* 1904, No. 33.

19. URBANTSCHITSCH. **Some new ear and nose instruments.** *M. f. O.*, 1905, No. 1.

13. This is an excellent description of the methods of examining the ear which are of value to the general practitioner. The previous history, inspection, palpation, catheterization, methods of testing the hearing, determination of one-sided deafness, determination of simulation, electric examination, general examination and static examination are described. The technique of Politzer's experiment is not given, probably inadvertently, in the chapter on the examination of the middle ear with the introduction of air by the tube.

BRÜHL.

14. The phenomenon of fatigue of the healthy 8th nerve is described, which is of course more pronounced in diseases of the nerve. A vibrating tuning fork is held in front of the ear until it dies out, then it is again held before the ear without starting it to vibrate. The patient then will hear the sound again on repeating the experiment once or twice. It seems to me there is a loss of relation between the hearing distance for voice and the hearing duration for the tuning fork. BRUHL.

15. The author recommends this method of treatment with a specially devised apparatus to remove the discharge in acute and

chronic middle ear suppurations. He thinks it especially important that the apparatus can be employed daily by the patient himself. The apparatus can also be employed to exert a suction on the middle ear by way of the tube. HAENEL.

16. Sondermann's apparatus for suction treatment of middle ear suppurations can also be employed for the massage of the ear, and is especially adapted for treatment by the patient himself.

HAENEL.

17. The author believes that aurists should attempt to instruct the public on the fraud which is perpetrated by placing on sale instruments of no value, and frequently injurious, which are said to cure all degrees of deafness. He was able to prevent the patenting of such an apparatus in the Royal Hungarian Patent Office.

HAENEL.

18. Report of three cases in which, according to Politzer's method, the mastoid cavity was filled with paraffin of 43 % melting point some time after the operation.

Case I. A girl one year of age. At operation the diseased sigmoid sulcus was exposed for 1½ *cm.* The wound reopened three months later, and at the second operation the entire cavity had to be again explored and the bony wall curetted. Three days later the cavity was filled with paraffin and the cutaneous wound closed with sutures without result.

Case II. A man thirty-six years of age. The entire mastoid process was removed up to the posterior wall with opening of the antrum. Ten days later the large cavity was filled with paraffin and the wound was sutured. Uneventful recovery without reaction.

Case III. A forty-two year-old male patient. Extensive disease of the temporal bone, extradural abscess on the left petrous surface. Resection to the area between the porous acusticus and the jugular foramen. Fourteen days after operation paraffin and suture. Recovery without reaction. MULLER.

19. 1. An apparatus for irrigating the attic. 2. An instrument to determine small distances in the depths of the nose and of the external auditory canal. 3. Nasal Vibrator. According to the vibrating apparatus invented by Ewer for the larynx, a similar apparatus has been invented for the external nose which is supposed to do good service in the acute swellings of the mucous membrane.

PIFFL.

c.—DEAF-MUTISM.

20. HABERMANN. **On congenital deaf-mutism.** *A. f. O.*, vol. 63, p. 201.

21. FALTA. **On the care of deaf-mutes.** *A. f. O.*, vol. 63, p. 161.

22. SAINT-HILAIRE. **On the pathology of deaf-mutism.** *Arch. internat. d'otol.*, etc., vol. 19, p. 125.

23. TRÖMMER. **On the pathogenesis and treatment of stuttering.** *Wiener klin. therapeut. Wochenschr.*, Nos. 8 and 9, 1905.

20. The temporal bones were obtained from a deaf-mute forty-four years of age who had died of pernicious anæmia. The author gives the results of his examinations briefly as follows: The right ear: In the middle ear there is a moderate chronic inflammation, with thickening of the mucous membrane and broad adhesions of the head of the hammer to the upper wall. There are adhesions about the head of the stapes. There is a moderate hyperostosis in the posterior area of the promontory and a small exostosis in the anterior wall of the niche and of the oval window. The anterior and lower part of the base of the stapes is thickened and there is a circumscribed necrosis of the lower posterior part. In the internal ear the nerves of the round saccule of the cochlea are atrophied as well as the peripheric ganglion cells in the spiral canal. The ductus cochlearis is enlarged in the greater part of the cochlea. In the final part of the basalar whirl it is diminished by partial adhesions of the walls. The stria vascularis has changed in form in one part of the basal and of the apical convolutions. Hypoplasia of Corti's organ. The endolymphatic circulation in the cochlea is disturbed. Similar conditions were found in the left ear but of different degrees. In regard to the interesting peculiarities, it is necessary to refer to the original. The probable cause is supposed to be an inflammation which occurred in embryonal life. HAENEL.

21. General rules for the treatment of deaf-mute children. The proper selection of toys, pulmonary gymnastics, running exercises, speaking exercises, instruction after the 7th year. The use of uniforms for deaf-mutes in cities aids in the determination of a professional avoidance of alcohol and nicotine excesses.

OPPIKOFER.

22. In one hundred and thirty-one inmates of the Deaf-Mute Institution of the Seine, fifty-one belonged to the congenital and seventy-five to the acquired deaf-mutism. In six the nature of the

deaf- mutism was uncertain. The congenital as well as the acquired deaf-mutism is present especially in degenerate families.

OPPIKOFER.

23. Trommer regards stuttering as superinnervation, as hypertonia of certain speaking muscles. It consists in a convulsive innervation of a beginning position in phonation.

He believes that every stutterer is placed under an auto-suggestion. There is no coördination-neurosis but a forced neurosis. He does not believe that stuttering is associated with adenoid vegetations, and the facts do not confirm that neurasthenia is caused by disturbance of speech. As stuttering is most pronounced between the 4th and 7th year, it is important during these years that the parents and educators of the children should be especially careful to draw the attention of the child to the quality of its speech.

The author is opposed to Gutzmann's method and recommends the use of only the potent factors in this method, namely, 1. Speaking with prolonged vowels, 2. Speaking in a monotone rythm, 3. The combination of sound pictures in which each sentence is converted into a word and the initial position is avoided. He believes that hypnotism can be recommended as a cure and gives a number of examples. WANNER.

EXTERNAL EAR.

24. SPRINGER. **The development of hemangioma after perforating the ear lobule.** *Prager med. Wochenschr.*, 1904, No. 34.

25. SZENES. **On the therapeutic significance of secondary otitis externa.** *A. f. O.*, vol. 63, p. 268.

26. LEWIN. **A case of unusual escape of cerebrospinal fluid from the ear with intact drum membrane.** *Vortrag, gehalten in der St. Petersb. oto-laryngolog. Gesellsch. am 18, Dez. 1904.*

27. SZENES. **Report of cases.** *A. f. O.*, vol. 64, p. 1.

24. A child with a hemangioma of the left lobule as large as the head of a pin, suffered from a purulent inflammation in this locality after the lobule had been perforated by a midwife. Subsequently the hemangioma developed rapidly and extended over the lower half of the external and inner surface of the auricle. After treatment with hot air and puncture with the thermocautery, the tumor diminished in size.

A similar second case is also reported. PIFFL.

25. The author repeats a previously expressed opinion that in

acute purulent otitis the onset of a diffuse inflammation of the auditory canal exerts a beneficial influence on the course of the otitis media. HAENEL.

26. The author demonstrated a patient, a girl fourteen years of age, who after an injury three weeks previously with a small wound at the left ear discharged an unusual quantity of pale, watery fluid, (between 2 and 3 litres daily). On examination the bony part of the left auditory canal was found narrowed on account of a swelling of the walls, especially of the anterior, which at the transition to the upper wall was contiguous to the short process. Palpation of the anterior wall and pressure on the tragus caused severe pain. There is no perforation or rupture, nor any other sign of a hemorrhage to be seen on the drum. The hearing of the left ear is very much reduced. The author believes that this is a case of traumatic injury of the base of the skull with resultant fissure which passed through the upper and anterior walls of the auditory canal without having invaded the labyrinth capsule. The rupture of the soft parts probably took place behind the swollen anterior wall of the canal in the anterior and upper angle. SACHER.

27. Three tumors of the aural region are described: 1. Giant-celled alveolar melanosarcoma of the right auricle. Onset three years ago. Removal by operation. Death four months later from miliary tuberculosis. No metasteses found at autopsy. 2. Epithelioma of the auricle in a man seventy-one years of age. Onset six years ago. After the operation rapid recovery. Up to the present time no recurrence. 3. Free osteoma of the right auditory canal. It developed in a woman fifty years of age from an exostosis of the posterior auditory canal from which it subsequently became entirely separated. Previous middle ear suppuration of long standing. The removal of the tumor took place after retraction of the auricle. HAENEL.

MIDDLE EAR.

a.—ACUTE OTITIS MEDIA.

28. LABARRE. **Cases of acute mastoiditis not preceded by otitis.** *Journ. Amer. Med. Assoc.*, November 26, 1904.

29. HRACH. **A case of metastatic pneumonia after a suppurative otitis media.** *Wien. med. Wochenschr.* No. 11, 1905.

28. Differing from the generally accepted rule that mastoiditis develops from otitis, cases are occasionally observed in which one of

the two cavities is invaded with a purulent inflammation while the other remains free. These cases are not unimportant, because their diagnosis is difficult and their consequences are often unpleasant. The explanation, according to the author, is that in consequence of disturbance of circulation the swollen mucous membrane of the aditus forms a barrier in cases of purulent inflammation, so that the middle ear becomes invaded while the antrum remains free. The diagnosis and treatment are described. Stress is laid upon early "paracentesis of the antrum," i. e., the mastoid operation. Four cases are reported. BRANDT.

29. Hrach believes that an old ear process was set up anew by influenza which led to a thrombophlebitis and sepsis. WANNER.

b—CHRONIC MIDDLE EAR SUPPURATION.

30. MAX. **Abnormal topographical relations of the internal carotid and the bulb of the jugular vein to the tympanum.** *Wiener med. Wochenschr*, Nos. 1, 2 and 3, 1905.

31. LEDERMANN, M. D. **Radical operation for the removal of a bullet weighing 70 grains embedded in the internal wall of the middle ear, with decided improvement in the subjective symptoms.** *Medical Record*, March 11, 1905.

32. RICHARDS, J. D. **Technique of the radical operation for chronic suppurative otitis media.** *Annals of Otology, Rhinol. and Laryng.* March, 1905.

33. PHILIPS, W. C. **Radical operation for chronic otitis media; two fatal cases.** *Annals of Otology, Rhinol. and Laryngol*, March, 1905.

30. After a review of the literature on the subject, the case of a seventeen-year-old patient with right-sided otorrhœa is described. At the medial, anterior and lower tympanic wall there was a defect mucous membrane. It was occupied by a bluish-gray, soft elastic in the bone, which was 1 to 1½ mm. deeper than the surrounding membrane which was in constant motion. The pulsation was synchronous with the pulse and on operation disappeared with the diminution of the pulsating surface.

The various cases of hemorrhage from the carotid artery are then reported. In the second part Max gives a description of the five cases which have been published where the bulb has been injured by paracentesis, and adds a sixth case. A child four years of age, suffering from rickets, left-sided acute otitis, after paracentesis performed in the posterior upper and posterior lower quadrants severe hemorrhage from the canal and nose. After recovery the posterior

lower quadrant and part of the lower portions of the upper are bluish-white in color with a convexity directed upwards. Pressure exerted on the region of the internal jugular causes the posterior lower quadrant to be more distended and the bluish-white color more intense. The right drum shows a similar condition.

This case of Max's is the only one in which the injury occurred on the left side. The author recommends in cases of hemorrhage a pressure dressing with iodoform gauze. WANNER.

31. A colored woman, twenty-four years of age, was shot three years ago in the left side of the head at close range with a 32 calibre revolver held within six inches of the head, the bullet entering above the tragus. She was unconscious for several weeks and dizzy until the time of operation. Facial paralysis followed the injury and remained, as also suppuration. The external auditory meatus was obstructed by a fibrous tumor, which was removed. The posterior half of the left membrana tympani was largely perforated and the edges covered with granulations. The opening in the drum seemed to be filled with a darkish mass resembling a blood clot of bluish color, metallic sound, the bullet in situ. The leaden mass extended behind and above the posterior and superior boundary of the annulus tympanicus. The radical operation revealed upon elevating the periosteum small dark spots over the bone surface where particles of lead had spattered as the molten mass had entered the skull. The large mass of lead occupied the posterior surface of the internal wall of the middle ear. The bullet could not be lifted from its bed, but was removed piece-meal with chisel and mallet, and with the curette 70 grains of lead in shavings. The dizziness was much lessened, the speaking voice perceived and the patient able to walk without support. The facial paralysis slowly improved. M. TOEPLITZ.

32. *Richards* makes a curved incision from the mastoid tip to a point of the scalp corresponding to the top of the pinna, its center about one inch posterior to the line of the auricular attachment. The knife should sink to the bone except in the part above the posterior zygomatic root only down to the temporal fascia, preserving the temporal muscle. The posterior lip of the curvilinear incision should not be retracted. The cartilagino-membranous canal is next separated from the bony canal. The removal of bone should be commenced by enlarging with the gouge the postero-superior arc of

the bony meatus backward, instead of entering the antrum primarily. For the enlargement of the excavation of bone cavities a strong round curette, for the removal of the bony "bridge" between antrum and tympanic cavity the Jansen forceps is used, but the chisel cannot be laid aside in the latter procedure. The external attic wall is then removed, followed by the lowering of the "inferior pillar" over the vertical portion of the facial with the curette. The external wall of the hypotympanum, viz., the inner end of the floor of the auditory canal, should be removed with the curette, as also the pneumatic cells posterior to the round window and in the posterior portion of the hypotympanum. The hump in the middle of the floor of the auditory canal should be levelled, and the floor itself be widened at the expense of the base of its anterior wall, the extreme anterior portion of the annulus tympanicus is also removed with the round curette. The accessible portion of the tensor tympani muscle and its canal is destroyed, and also the diseased cells found in the vicinity of the tympanic orifice of the Eustachian tube. The meatus is made from a large curved upper flap bevelling into the concha and a slight inferior flap both held in position by sutures. A small skin graft is applied to the facial ridge. The curvilinear incision is sutured. Secondary skin grafting is done through the meatus, but not over the windows as soon as healthy granulations arise. Of 22 consecutive chronic cases operated upon according to the above technique, complete epidermisation has followed 21 times. M. TOEPLITZ.

33. Case I. Girl, aged fifteen years, right ear began to discharge three years ago while being treated for tubercular hip joint disease and with evidence of pulmonary tuberculosis. Two years later she had an attack of keratitis followed by specific iritis. Ossicles necrotic, profuse discharge. Radical operation. The mastoid cells were involved, the pus contained smegma bacilli; the dura was exposed for a considerable area. Closure of posterior wound. Temperature fluctuating between 100° and 102°. Pus from the posterior wound. On third day after operation severe headaches, discharge odorous. Swelling and œdema about the wound, but subsiding. On sixth day T. 104°, on ninth—106.6°. Unconsciousness. Death. No autopsy. No marked symptoms of intracranial disease. Case II. Girl of twenty-one, had diphtheria when three years of age, followed by suppuration of both ears. Pain in the right mas-

toid, right facial paralysis. Smear from the discharge showed a mixed infection. Radical operation. The antrum was filled with a tumor-like mass, the middle ear with granulations. The posterior wound was closed. The next day vomiting, severe pain in the lumbar region, T. 99°. On second day T. 104°. Pulse intermittent. Urine contained much albumen and casts. Death on third day. Two weeks before admission to hospital she had vomiting, headache, partial loss of consciousness, lasting for three to four hours. No autopsy. M. TOEPLITZ.

c.—CEREBRAL COMPLICATIONS.

34. ALT. **The relation of purulent otitis to epidemic and tuberculous meningitis.** *M. f. O.*, No. 9, 1904.

35. HOFER. **Otitic meningitis.** *Wiener med. Wochenschr.* No. 5, 1905.

36. ALT. **Cholesteatoma of the middle ear as a cause of intra-cranial disease.** *Wiener med. Presse*, No. 5, 1905.

37. HENNEBERT. **Purulent meningitis of otitic origin healed after the mastoid operation.** *La Presse oto-laryngologique Belge*, 1905, Book 1.

38. SOKOLOWSKY. **On the diagnosis and the question of operation in diffuse otitic purulent meningitis.** *A. f. O.*, vol. 63, p. 238.

39. GROSSMANN. **On lumbar puncture and circumscribed meningitis.** *A. f. O.*, vol. 64, p. 24.

40. SSACHAUSKI. **On otitic pyæmia.** *Russki chirurgitscheski Archiv*, 1903, Book 6.

41. MCKERNON, J. F. **Case of brain abscess resulting from chronic purulent otitis media.** *Annals of Otology, Rhinol. and Laryngol.*, March, 1905.

42. CLAIRBORNE, J. H. **A case of purulent meningitis following an attack of acute middle ear disease. Death. Autopsy.** *Ann. of Otology*, December, 1904.

43. DUEL, A. B. **Cases illustrating difficulties in diagnosis in intracranial extension of suppurative otitis in the presence of a pulmonary complication.** *The Laryngoscope*, January, 1905.

44. RICHARDS, J. D. **A case of infective lateral, sigmoid and superior petrosal sinus and jugular vein thrombosis. Operation. Recovery,** *Amer. Journ. Med. Science*, February, 1905.

45. ALLEN, J. F. **Fatal case of cerebellar abscess.** *Amer. Medicine*, January 7, 1905.

46. DENCH, E. B. **A case of acute suppurative otitis media complicated by double pneumonia, septic thrombosis of the jugular bulb, operation. Excision of internal jugular; general systemic infection, death.** *The Laryngoscope*, January, 1905.

47. MCKERNON, J. F. **A case of brain abscess following purulent disease of the middle ear.** *N. Y. Eye and Ear Infirmary Reports*, January, 1904.

34. The author is of the opinion that the ear is to be regarded as the port of entrance or the intervening medium of infection in epidemic cerebrospinal meningitis. The proof has thus far not been furnished because the ears have not been examined in enough cases in the living and frequently overlooked at autopsy.

Based on two personal and four observations of other authors, the author further states that in his opinion acute otitis media not of tuberculous character in patients with a latent tuberculosis may be the cause for the development of a tuberculous meningitis, and these meningeal inflammations should themselves be regarded as otitic. PIFFL.

35. Two cases of chronic suppurations with extradural abscesses in the middle and posterior fossæ, which recovered; 1 case of purulent meningitis terminating in death. Puncture of the dura evacuated clear serum. Lumbar puncture produced slight but diffuse cloudiness with minute follicles. At operation there was no purulent focus. The author believes that the suppuration extended along the anastomatic lymphatic and blood vessels. The case was presumably one of influenza. WANNER.

36. This is a paper meant for the general practitioner in which the origin of cholesteatoma in general coincides with the theory of Habermann-Bezold; then the conservative and operative treatment are added, and the advice is given to the general practitioner to undertake the study of otology. WANNER.

37. The operation in purulent meningitis consists in the complete surgical removal of the original trouble (the mastoid operation in acute cases, the radical operation in chronic cases, extraction of sequestra, opening of the labyrinth, opening of the cranial cavity), in extensive lumbar puncture, in exposure of the cerebral membranes, crucial incision and frequently repeated lumbar puncture. A cured case of purulent meningitis was reported. BRANDT.

38. This case observed in Gerber's Clinic showed the presence of bacteria in the lumbar fluid, so that the diagnosis of diffuse purulent meningitis seemed confirmed. After five days in which the classical symptoms of meningitis gradually gained in intensity, the case was brought to recovery by the operative exposure of the primarily affected middle ear (cholesteatoma). In literature the author was able to find five additional cases where diffuse purulent meningitis of otitic origin had been cured by operation. Con-

sidering that the two cases reported by Schulze were undoubtedly cases which recovered without operation, Sokolowsky does not maintain that all severe cases of this kind should be treated by operation, but recommends to leave unoperated cases which run a very acute course. The more subacute cases should be operated upon. This case is also interesting because at a secondary operation a large sequestrum of the cochlea was removed. The table of labyrinth necrosis collected by Oesch-Gerber is supplemented by these five other cases, so that the published cases now amount to ninety-five.

HAENEL.

39. This case from Lucae's Clinic was one of chronic purulent otitis suggestive of a diffuse purulent meningitis. Diplococci were found in the cerebrospinal fluid. The operation, nevertheless, was undertaken because the sensorium was free. Recovery took place. This case is not regarded as one of healed diffuse meningitis but rather a proof that slight turbidity and the presence of bacteria in the lumbar fluid occur in circumscribed meningitis. It seems most probable in this case that there was no inflammation of the meninges and that the increase and changed constitution of the cerebrospinal fluid was simply influenced by the absorption of purulent masses by way of the lymphatics. In order to prove that the resorption of the toxic substances may change the constitution of the liquor and may clinically resemble the septicemia of a diffuse purulent meningitis Grossmann reports a case of septicemia of otitic origin which terminated fatally under the picture of a meningitis where lumbar puncture showed a clouded fluid under pressure containing numerous pus corpuscles but no bacteria. Finally a case of circumscribed meningitis with focal symptoms was reported, which was cured by operation but where no lumbar puncture was performed. HAENEL.

40. The histories of eleven personally observed cases are given, of which six were cases of pyæmia and five of sinus thrombosis. Of the first group two recovered after metastatic foci had been opened; of the second, one recovered. SACHER.

41. A girl, aged eleven, had an almost continuous discharge for eight years after measles. She was during the last month very dull and irritable, at night restless and crying as if in pain. Four days before she was first seen there was vomiting, with photophobia, headache, stupor, unconsciousness and refusal of food. The color was indicative of sepsis. T. 97.3°, P. 52., R. 14. The right

external meatus was filled with a large polypoid mass and pus. Diagnosis: Brain abscess. Double choked disks. Brain exposed primarily and entered near the floor of middle fossa, directly above the mastoid antrum. Dura white and lustreless, not prominently bulging. The knife was directed upward for an inch and pus was gushing through the opening with much force to the amount of from 3 to 4 oz. The abscess was limited by membrane. The pulse increased. The necrotic mastoid filled with cholesteatomatous masses was emptied. Impairment after six hours. T. 106°, P. 180. Death eight hours after operation. The pus contained mixed infection. M. TOEPLITZ.

42. A man aged forty-five, coryza for one week; acute pain and copious purulent discharge in right ear; constant headache; dizziness for one month. Apparent relief with onset of coma; flexure of right arm and hand; left sided conjugate deviation of eyes. Optic disks normal. Chin turned to the right and upward. Death. Autopsy: Pia covered with thin yellowish pus over the right mastoid, the entire cortex and some over the base of the brain. Petechiæ on petrous bone and tegmen antri, in which there is a small aperture, through which the pus passed into cranial cavity. M. TOEPLITZ.

43. In case I., a girl, six years old, two weeks after recovery from a broncho-pneumonia with acute suppurative otitis media sinistra, the ear discharge continued, and a week later mastoidectomy was performed. Intermittent temperatures between 106° and normal temperature for three days. Lungs free. A disintegrating thrombus extending from the knee to the jugular bulb was found in the lateral sinus. Jugular tied below the clavicle and dissected out to bulb, enlarged gland along the vein removed, clot taken out of the sinus, the walls curetted and packed. Recovery. Case II. A woman had grippe, acute catarrh of the respiratory tract, acute bilateral otitis media followed by double paracentesis. Tenderness of the right mastoid. Discharge contained streptococci and a diplococcus resembling pneumococcus. Temperatures intermittent between subnormal and 106°, and two chills. Recovery without cough or expectoration. Case III. A female, seventeen years of age, had an otitis media acuta dextra, T. 101.8°. Incision, streptococci, tender mastoid, sagging of posterior upper canal. Mastoidectomy revealed pus and granulation. After operation T. be-

tween 100° and 104.6°. Leucocytes 20,000. Seventy hours after the first rise of temperature a lobar pneumonia of the right lung was found. Crisis took place on the fifth day. There had never been any cough nor expectoration. Further intermittent temperatures for ten days were due to resolution. M. TOEPLITZ.

44. After an acute suppuration of the middle ear and a repetition after more than three years, an acute exacerbation took place ten months later with profuse purulent discharge, which apparently ceased at the end of the third week. Two days later spontaneous pain appeared in mastoid, and also intermittent headache. No fever, but vomiting. Marked tenderness over tip, exquisite over mastoid. T. 99°. Under mastoid cortex pale velvety granulations between healthy cells containing straw-colored fluid (septic phlebitis of minute veins.) Schwartze-Stacke operation. No pus in cells and antrum, but profuse exuberant granulations. Vessel wall of vertical limb of sigmoid sinus covered by dirty blackish, breaking-down granulations. The sigmoid sinus was exposed, but not opened. Extensive osteomyelitis of occipital and parietal bone. Three hours after operation temperature rose to 100.4° and continued the next day somewhat higher. Right papilla now blurred. The sinus was opened below the knee, the lumen was occupied by firm, granular clot, but did not contain fluid blood. Jugular was resected; it contained fluid blood only to the point of entrance of the facial into the jugular vein. Jugular was ligated behind the sterno-clavicular joint and resected. The superior petrosal sinus was occluded. The external wall of the lateral sinus slit out to a point ¾″ from the torcular; midway between this point and the sinus knee four or five drops of pus exuded from the clot. The opposite jugular was blocked for the purpose of creating a reverse pressure upon the torcular and on the thrombus, dislodging it, followed by a spurt of blood and the extrusion of a thin liver-colored clot, ½″ long. The torcular end of the sinus was then gently curetted after pressing upon the opposite internal jugular. On the fourth day after the operation papillitis in the left eye. On the fifth day, upon removing the packing, several drops of pus exuded from the upper wound. The pus in the lateral sinus contained pure staphylococci. When attempting to curette a thrombus from the region of the bulb, pressure should be made not only over the internal jugular of the corresponding side, but also

over both internal jugulars, thus eliminating more effectually the aspiratory influence of inspiration. RICHARDS does not advocate the attempt at curetting the region of the jugular bulb prior to jugular ligation after having slit the external wall of the vessel to a point as near the bulb as possible. M. TOEPLITZ.

45. A male, aged sixteen, suffered from a left otitis media acuta, slight tenderness of the mastoid and discharge a year prior to present attack, which began three days before admission with severe pain in left ear and mastoid tenderness for two days. The membrana tympani was bulging in the posterior superior quadrant. Paracentesis followed by free discharge of pus; Leiter coil. Two days after admission, vomiting. Next day another paracentesis, dullness and apathy, but sensorium free. Lower jaw deopped, expression vacant. Pain in the ear removed by incision. On day following temperature 100°, pulse 80. Headache appeared in the left temporal region, numbness in hands and feet. The posterior superior wall of the membranous canal was drooping, tenderness over tip and antrum continued. Operation, usual mastoid, revealed much pus below cortex, and with granulations in antrum and cells, which extended far backward toward occipital bone. Improvement lasted ten days, except slow pulse. Expression natural, pallor continued, but headache disappeared. P. 55, T. 99°–100°. Ten days after operation, headache now in left frontal region, drowsiness, mental dullness continuing four or five days. On fifteenth day vomiting, T. 102°. Headache violent, T. normal again, at night 102°. Leukocytosis 15,000. Second operation. Uncovered sinus and exposed dura were found normal. T. following operation normal, P. 70, headache now in right occipital region, and vomiting on second and third day. Headache decreased, somnolence increased. P. 100° in the morning, 95° in the afternoon. Intelligent answers were given when aroused, some irritation of manner followed by active delirium lasting an hour. Eyes normal, Cheyne-Stokes phenomenon; semi-comatose. Third operation: Incision extended upward, flap over squama, dura exposed from tegmen to $\frac{4}{5}$ *cm* above, 3 *cm* wide, found normal. Brain probed without result. T. after operation 103°, P. rapid, feeble, intermittent, Cheyne-Stokes respiration, death. Pathological diagnosis: Suppurative mastoiditis. Abscess of the cerebellum. Pneumococcus infection. Pia congested, cerebro-spinal fluid clear.

In removing the brain from skull an abscess was found below, the tentorium cerebelli was ruptured and about 30 *ccm* of odorless pus escaped. A perforation in the cerebellum at a point corresponding approximately to the internal auditory meatus, possibly caused by trauma in removing the brain. There was no adhesion between cerebellum and temporal bone. On dissecting the left cerebellar lobe an abscess cavity about 4.5 *cm* in diameter, without pyogenic membrane of recent date. Smears from pus revealed lance-shaped diplococcus.

M. TOEPLITZ.

46. A man, aged thirty-one, had been suffering for a week from severe pains in the left ear, following an attack of grip. The ear was discharging for three days. On the way to the hospital a severe chill took place. There was a slight amount of sero-purulent discharge from the left ear. The drum membrane was bulging, a small perforation and the upper posterior wall of the meatus sagging; some tenderness over mastoid antrum, acute tenderness over tip and behind it. Free incision into drum and sagging canal. Pneumonia of the right lower and of the left lower lobe of the lung. The ear drained freely; the discharge contained streptococci, the sputum pneumococci. On the 12th day patient defervesced to 100°, but in a few hours T. rose to 105.5°. Remission on the next day to 100° with another rise, the fluctuation continuing for several days. At entrance into the hospital pain was felt in the right knee joint, mastoid tenderness only at tip and below. Septic temperature was considered due to lesion at the jugular bulb. Operation on the 19th day. No pus in mastoid, sterile fluid in a few cells at the tip. The lateral sinus contained a clot. Two drachms of pus escaped from the region of the bulb. No circulation was established in a downward direction. The jugular was ligated low down in the neck and dissected. Temperature sank to 101°, but rose again intermittently and was twice 106°. There was pain in the left knee, left wrist and right shoulder. A tumefaction in the neck over a point at the upper end of the ligature of the jugular was incised; sero-sanguinolent fluid escaped. Death ensued seventeen days after the operation from profound general sepsis.

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47. A male, aged sixteen, had a discharge from the left ear for twelve years following measles. During the past years he had several attacks of pain with interruption of discharge. For the

last six weeks continuous headache, past three weeks fever, chills every other day prevailed. For the past two weeks he was drowsy, comatose, delirous and screaming at night. Stiffness of the muscles of the back of the neck, marked aphasia and septic appearance were noted. Choked disks and retinal hemorrhage observed. Death took place before an operation could be instituted. The autopsy revealed adhesions over tegmen tympani. In attempting to remove the brain, an abscess in the left temporo-sphenoidal lobe was ruptured with much greenish pus occupying the entire lobe and occipital portion. The opening in the tegmen was $\frac{1}{16}''$ in diameter, corresponding to depression on the under surface of the temporo-sphenoidal lobe. There was a mixed infection.

M. TOEPLITZ.

d.—OTHER MIDDLE EAR DISEASES.

48. JUERGENS. **Chemical burn of the jugular vein and of the carotid artery from the ear resulting in death from hemorrhage.** *M. f. O.*, No. 10, 1904.

49. LEWIN. **On diphtheria of the middle ear.** *A. f. O.*, vol. 63, p. 229.

50. WELLS. **Two cases of objective aural tinnitus due to the action of tubo-palatal muscles.** *Journ. Amer. Med. Assoc.*, January 21, 1905.

51. SMITH, S. MACCUEN. **Bezold's variety of mastoid disease complicating diabetes mellitus.** *American Medicine.* February 11, 1905.

52. RICHARDSON, C. W. **Osteo-myelitis of the temporal bone.** *The Laryngoscope*, April, 1905.

53. HARRIS, T. J. **Electrolysis of the Eustachian tube.** *Ann. of Otol.*, etc., December, 1904.

48. The case is that of a young soldier, and the caustic action had been produced by a strong acid. The patient died seven weeks later, bleeding to death after the hemorrhages had repeated themselves fifteen times. They were at first venous, from the jugular vein, later arterial in character, from the internal carotid. The author has already published similar cases. PIFFL.

49. Lewin objects to the standpoint of Koprak, who believes that the diagnosis of middle ear diphtheria should be made purely from bacteriological examination without reference to the pathological condition of the diphtheritic inflammation, and demands that the diagnosis of middle ear diphtheria should be made by the bacteriological presence of diphtheria bacilli and the typical fibrinous membranes in the middle ear. HAENEL.

50. Case I. A young man, aged twenty-four, had for the past

two years, been subject to a loud ticking noise in both ears, increasing and more distressing of late, likened to the snapping of fingers, occurring ten to twenty times in quick succession, and about sixty times a minute, more persistently when tired, also during swallowing and deep breathing. The noise is accompanied by an up and down movement of the larynx, which may be unaccompanied by the aural sounds. The snapping could be heard at about 12″ from the ear. Watch A. U. $= \frac{1}{72}$. The muscles of the pharynx and the palate were in an almost continuous spasm, accompanied by the up and down movement of the larynx, isochronous with the aural sound. The posterior lower lip of the Eustachian tubes moved forward and upward, narrowing the opening of the tubes.

Case II. In a young woman a voluntary clicking had existed for a long time, associated with feeling of fullness in the right ear, produced by a movement of the throat similar to that made in the act of yawning. The clicking could be objectively perceived four or five inches away from the patient. There were slight, jerky contractions of the posterior pillars with occasional elevation of the palate; the clicking noise was isochronous with the contractions of the m. palato-pharyngeus. M. TOEPLITZ.

51. SMITH gives the history of but one of the diabetic ear cases, which were nearly alike, as follows: A man, aged forty-one, had, in his 36th year of age, a sudden increase in the amount of urine voided with specific gravity 1030 - 1055, sugar of from 4 - 10 %. After a year severe pain appeared on the left side of the head and mastoid and continued for three weeks, when the neck below the tip became very painful. Two weeks later a fluctuating swelling appeared below the mastoid, which enlarged a week later and descended to a point about 1″ above the clavicle. There was never any pain in the middle ear nor any swelling over the process. Schwartze - Stacke operation exposed a large carious opening perforating the tip of mastoid. The antrum and the superior part of the cells presented dry gangrene or necrosis, the tip was bathed in greenish yellow pus, covering foul smelling granulations and débris. An abscess of the neck was emptied. Recovery took place. A year later œdema of the larynx and diabetic coma was followed by death. The term "diabetic ear" should be limited to those beginning with primary osteitis of the mastoid, or with simultaneous tympanic and rapid mastoid involvement. M. TOEPLITZ.

52. The features of *Richardson's* case of a girl, fourteen years of age, were the occurrence of mastoidal inflammation after a non-perforative inflammation of the middle ear, the rapidly occurring and extensive œdema of the soft tissues, the presence of extensive granulations in the antrum and zygomatic cells and the presence of all manifestations of osteo-myelitis without the typical temperature curve. M. TOEPLITZ.

53. There is a certain degree of value in the method in a relatively small number of cases. It is attended with no small degree of danger, and should be employed only after every other means of establishing the patency of the tube has been tried and failed. The most scrupulous attention to antisepsis is essential, as also the greatest gentleness. In the majority of cases the process is not a true electrolytis. M. TOEPLITZ.

NERVOUS APPARATUS.

54. ALEXANDER. **Problems in the clinical pathology of the static organs.** *Bresgens Sammlung viii, 3. Antrittsvorlesung.*

55. VON FRANKL-HOCHWART. **On the diagnosis and prognosis of Meniere's symptom complex.** *Jahrbücher für Psychiatrie und Neurologie*, vol. xxv., p. 245, 1905.

56. SUGAR. **On Meniere's disease and its treatment with the galvanic current.** *A. f. O.*, vol. 63, p. 217.

57. ZERONI. **On the pathology of the internal ear.** *A. f. O.*, vol. 63, p. 174.

58. STENGER. **On the forms of neurosis following injuries to the head. The traumatic labyrinth neurosis.** *Deutsche med. Wochenschr.*, No. 2, 1905.

59. BÜRKNER. **On the treatment of nervous ear diseases.** *Deutsch med. Wochenschr.*, No. 3, 1905.

54. Starting from Flourens' discovery of the physiological dualism of the internal ear and its clinical application by Ménière, the author is of the opinion that the term, Ménière's symptom complex should be substituted for Ménière's disease. Very probably the case originally reported by Ménière of hemorrhagic exudation into the labyrinth was no primary disease but of leukemic nature, so that the term Mènière's disease is improper. There are diseases of the static part of the labyrinth with and without Ménière's symptom complex. The diagnosis of these diseases can be aided by examination in the following groups of diseases: a. All cases in which the triad of Ménière's complex appears. b. Cases of the so-called pseudo-Ménière type of von Frankl-Hochwart, consisting in the presence of two of Ménière's symptoms, vertigo and vomiting with

an absence of the third symptom (disease of the acoustic labyrinth). c. Purulent inflammation of the internal ear. d. Traumatic injuries of the auditory organ, as well as the cases of progressive deafness consisting in diseases of the acoustic labyrinth or of the labyrinth capsule. e. Cases of congenital or acquired deafmutism.

Alexander discusses the diagnosis of these various groups and shows in what way the diagnosis of diseases of the static labyrinth can be developed. The diagnostic aids can be divided into: a. Those which record the results of the previously observed cases of Ménière's and the pseudo-Ménière symptom-complex and labyrinth suppurations. b. From the results of experimental physiology of the static labyrinth. c. From the examination of animals with congenital anomalies of the labyrinth. d. From examinations of deaf-mutes. BRÜHL.

55. Two hundred and eight cases of personally observed Ménière's vertigo are described. These are especially of value because it was possible in 80 cases to obtain the subsequent course of the disease for years. Most of these have been examined later by the author. In the introduction the author states that the division originally proposed by him was now generally being accepted. He speaks of Ménière's symptoms only in a general sense. These may appear in an apoplectic form (Ménière's disease according to some authors) or they may be added to previously existing ear diseases. Four typical cases of the apoplectic form are reported. In two additional cases, in one the facial nerve, in the other the sensory fifth nerve, were affected. Then the apoplectic-traumatic cases are described. In three caisson hemorrhages preceded the attacks, in ten severe traumatisms to the head.

As an introduction to the next chapter the symptom vertigo is first discussed, and the differential diagnosis of the aural vertigo is given from that of other forms. Examples are given to show that the danger of confounding this condition with brain tumor is not so great as would seem probable. Ménière's symptom-complex resembles tabes only in the ataxia, though it must not be forgotten that in tabes there are frequently labyrinth symptoms with vertigo, as is shown in seven new cases. The differentiation from arterio-sclerotic vertigo is more difficult, as old persons suffering from arterio-sclerosis are often deaf and frequently suffer from apoplectic attacks. The possibility of differentiation is illustrated by two cases. Then the polyneuritis cerebralis menieriformis is described.

The first case of this disease has been described by the author, which was followed by reports from others. It is characterized by an acute facial paralysis with paresis of the acoustic nerve, rotation vertigo, tinnitus, vomiting with not infrequent intercurrent trigeminal symptoms. The other reports treat the relations of Ménière's vertigo with neurosis. The term pseudo-Ménière is fully discussed. According to the author, this consists in attacks of vertigo, tinnitus and vomiting in patients with healthy ears. These are either epileptic aura or epileptic equivalents, possibly hysterical attacks. New examples are added from literature and personal observation in support of this statement. Of interest is the observation that a nervous woman suffered from the symptoms of apoplectic Ménière's symptom-complex with which her husband had been attacked. The relations to hemicrania are still unclear. The possible neurasthenic pseudo-Ménière form is described by only one case.

It is quite possible that Ménière's and epileptic attacks should be associated. The differential diagnosis is more difficult in the traumatic hysteria with sensible sensory hemianæsthesia because in the latter a true labyrinth affection is simulated.

Finally the very unusual "formes frustes" are described. The author diagnosticated in one case true aural vertigo in a person with normal hearing. Several weeks later distinct symptoms of a severe right-sided middle ear disease set in. It is also shown that the widespread opinion that the disturbances of hearing must necessarily be pronounced is not always correct because there are also cases in which the hearing is affected only to a slight degree. The vertigo generally presents the symptoms of an intense rotatory sensation. There are also cases in which there is a certain sense of coma. A number of cases are also added to show that the subjective noises may be absent.

As regards the prognosis of vertigo, the author has been able to get exact results with the aid of the above described method. In regard to the apoplectic-traumatic cases, the improvement was marked. Conditions were examined in which the vertigo appeared after a previous middle ear or labyrinth affection. As a minimum period of observation for the duration of the disease, two years are given. Forty patients were cured as regards vertigo, 21 improved, 13 unchanged. The hearing was usually unchanged, in one case diminished. Improvement in the subjective noises was generally of no consequence.

In a short final note on the treatment, the author warns against exaggerated local therapy. The most important means of treatment are complete rest, residence in high latitudes, small doses of bromides and iodide of potash, galvanization of the head and lukewarm baths. ALEXANDER.

56. Sugar explains this disease in a very convenient manner by the following hypothesis: the conditions of pressure and density and their changes, to which the labyrinth fluid is exposed and the influence of the spongy spaces which extend to the endosteum apparatus cause perforations through this delicate membrane, so that in some cases the perilymph of the labyrinth instead of the bony capsule separates the newly-formed spongiosa from the lymph-spaces. These perforations produce Ménière's disease in its mild or severe form. In the treatment the use of galvanic electricity is recommended. HAENEL.

57. The specimen was obtained from a man sixty-seven years of age, who had died from hypostatic pneumonia after erysipelas. The patient had suffered for many years from a left-sided otorrhœa, and ten weeks before death had been taken with severe attacks of vertigo. At this time a left-sided facial paralysis was also observed. Six weeks before death the radical operation was undertaken, and a cholesteatoma was found in the antrum, with a large defect in the horizontal semicircular canal and the facial nerve in the cavity. Microscopically the facial nerve, so far as it was exposed, was converted into cellular connective tissue, no separation of the nerve segments, with scarcely a nerve fibre to be recognized. The facial canal and horizontal semicircular canal showed no signs of a distinct destructive process in the bone. In the defect to the horizontal semicircular canal, new bone had been formed with correction of the defect. In the horizontal semicircular canal the granulation tissue had extended to the ampulla, the membrane structures are for the most part destroyed. The same conditions were observed in the posterior semicircular canal. The injury to the facial may have been the result of the pressure of granulation tissue or inflammatory processes. It was directly caused by the extensive destruction of its bony wall. The new formation of bone in the horizontal semicircular canal shows the regenerative power of the labyrinth capsules. The membranous labyrinth was destroyed by the proliferating granulations, though the semicircular canals showed no

inflammatory changes. The facial paralysis had presumably existed for a long time. The difference in the course of the disease of the semicircular canal as regards the onset of vertigo can be explained by the fact that in the cases without symptoms of vertigo there was a previous inflammation of the vestibular nerves, while in the intact nerve vertigo is the result of an irritation of the terminal portion of the vestibular nerve. In this case this irritation was produced by the varying amount of blood contained in the granulation tissue, or by hemorrhages into this tissue. HAENEL.

58. In judging the nervous conditions (headache, vertigo, stupor, tinnitus) which so frequently appear directly after, or a certain length of time after, an injury to the head, Stenger is of the opinion that it is important to examine whether there are any objective disturbances which point to an alteration of the labyrinth in its entirety or in one part. If this is correct, we should not speak of a traumatic neurosis—it is more properly a traumatic-labyrinth neurosis. For the proper examination of the injured terminal, it is absolutely necessary that an exact functional examination of the ear should be made. NOLTENIUS.

59. This is evidently a lecture designed for general practitioners and students. The various conditions such as hyperemia, anemia, hemorrhagic inflammations of the labyrinth and Ménière's disease are described. Finally the nervous tinnitus and otalgia, or more properly the neuralgia of the tympanic plexus, are treated. In the treatment the author believes that the primary disease should be treated in the first place, making the local treatment secondary.
NOLTENIUS.

NOSE AND NASOPHARYNX.

a.—GENERAL PATHOLOGY.

60. CHORONSHITZKY. **On nasal packing.** *M. f. O.*, No. 1, 1905.

61. IMHOFER. **The after treatment of nose operations.** *Zeitschr f. Heilk.*, 1904, Book ix.

62. DIONISIO. **The radical method in the surgery of the turbinals.** *Arch. internat. d' Otologie*, etc., vol. 19, p. 91.

63. PYNCHON. **Some improved nose, throat and ear instruments.** *The Laryngoscope*, February, 1905.

64. WILCOX. **Post-operative nasal hemorrhage; calcium chloride; secondary anæmia; rapid recovery.** *American Medicine*, March 18, 1905.

65. NEWCOMB. **The employment of mucin in atrophic conditions of the nose and throat.** *Annals of Otology, Rhinology and Laryng.*, December, 1904.

66. GOODALE. **A contribution to the study of the secreting mechanism of the nose.** *Annals of Otology, Rhinol. and Laryngol.*, March, 1905.

67. COFFIN. **The development of the accessory sinuses of the nose.** *Amer. Journ. Med. Science*, February, 1905.

60. The author recommends for packing the nose in hemorrhages the introduction of iron-chloride cotton, which has at present been generally abandoned. He introduces the packing immediately after each operation, and removes it after twenty-four hours. After treatment is uneccessary. The patient is discharged after removal of the tampon, and he has never observed any untoward results. After galvanocaustic of the mucosa the author recommends this same form of packing in order to prevent the hemorrhages which are not at all rare. Recently he has also used ferripyrin cotton (5 - 20%), which is less painful and less caustic. PIFFL.

61. The author objects strenuously against the cruel after-treatment to which patients are subjected after a nasal operation. Packing the nose is only necessary after operations on the bone, and to control the bleeding, in addition to packing he uses penghawar cotton, ferripyrin, and gelatin.

The simultaneous use of cutting instruments and caustic is not advisable. In general the after-treatment should be dry, especially with iodoform powder, later with other powders. After the galvanocaustic of the lower turbinal, which is followed regularly by the application of trichloracetic acid, xeroform seems to have acted well. The entrance is closed with cotton in this dry treatment, as the best prophylaxis against inflammation of the ear. PIFFL.

62. This is a short review of the methods for the removal of turbinal hypertrophies. For packing a drainage tube is inserted which has been surrounded with gauze. OPPIKOFER.

63. 1. For removal of submerged tonsil, three sickle shaped knives, right and left, for dissection of anterior and posterior pillars, and two separators, right and left, for dissection from posterior attachment. 2. Modification of Sloane's snare, whereby a short wire loop can be used; the écraseur nut is enlarged and provided with projecting points. 3. Tonsil tenaculum. 4. Tonsil presser. 5. Tonsil hemostat of horseshoe shape, with a hard wood button and oval cup, filled with cotton. At the external end is a metal pad

with screw adjustment. 6. Adenoid curette, a small ring knife with cutting edges at either side. 7. Nasal speculum, not a substitute for Pynchon's speculum, but intended for special cases; it has narrower blades and an outer horn to hold up flabby tissue and a set screw to prevent its being opened beyond a desired point.

M. TOEPLITZ.

64. A man, aged twenty-five, was operated on the right side of the nose, through removal of anterior half of middle turbinal and a small spur, under cocaine and adrenalin, by means of snare and saw. Profuse hemorrhage on the fourth day was checked; oozing from posterior nares on fifth day, vomiting of blood on sixth day. On removal of packing from posterior nares profuse hemorrhage ensued, another on the seventh day. Calcium chloride, 2.6 grammes, was given. The patient was exsanguinated; anæmic murmurs in supraclavicular fossa. Blood: hemoglobin 40%; red corp., 1950000; white corp., 7730. Oozing of blood from posterior nares and vomiting of blood continued on eighth day. Calcium chloride was repeated. The bleeding gradually stopped, the plug was removed on thirteenth day and convalescence thoroughly established three weeks after operation. In addition to calcium chloride, solution of iron vitellin was given. M. TOEPLITZ.

65. Mucin is used in the "soloid" tablets composed of four and a half grains each of the mucin and the bicarbonate of soda, and one grain of menthol. One tablet is dissolved in half an ounce each of sterile water and sterile lime water, This solution is somewhat mucilaginous and is best preserved by adding thymol in the proportion of about half a grain to the ounce. Fresh solutions are preferable and should be applied on a cotton swab.

M. TOEPLITZ.

66. GOODALE reviews the present knowledge on secretion of the nasal mucous membrane and adds the results of personal investigations. The nasal fluid is composed of the secretion of the mucous and serous glands together with a definite proportion of fluid transuded through intercellular spaces of the mucous membrane, mingled with a varying amount of mucus derived from degeneration of epithelial cells together with leucocytes and cellular detritus. External cold adds by condensation a varying amount of water exhaled from the lower respiratory passages. Under pathologic conditions the glands and canaliculi become altered. In chronic rhin-

itis there is a heightened proliferation and mucous degeneration of the cells of the mucous glands without a proportionate increase in chronic hypertropic rhinitis. In atropic rhinitis the glands are diminished and there is an entire absence of canaliculi in the basement membrane suspending the transudation of fluid. In vasomotor rhinitis there is an increase of the canaliculi in proportion to the severity of the symptoms with a possibly heightened secretion from the serous, not from the mucous glands. M. TOEPTITZ.

67. COFFIN draws the following deductions from his own experience in the examination of skulls of infants and stillborn from the sixth month on, and from a review of the literature on the subject. 1. But two of the accessory sinuses are present at birth, viz.; the ethmoidal cells and the maxillary antrum. 2. The ethmoidal and the antrum are constant sinuses. 3. In infancy, the antrum does not occupy the same relative position in regard to the orbit as in later life, and cannot be reached or entered by the usual methods; neither can this be done, or satisfactory drainage effected, until after the descent of the second or permanent teeth with the destruction of a tooth socket. It makes impossible also the antral route to the ethmoidal and sphenoidal sinuses during this period of life. 4. The sphenoidal sinus makes its appearance shortly after birth and may be found as a distinct cavity as early as the end of the first year. Practically it may be considered as the most posterior of the posterior ethmoidal cells. 5. The frontal sinus is not present at birth. It appears first in the orbital plate of the frontal bone between the end of the first and the beginning of the third year. Practically at this time it is the most anterior of the anterior ethmoidal cells. Its appearance in the vertical position is from the third to the sixth or seventh year. The accompanying figures illustrate the stage of development of the various sinuses at different ages from the six month fœtus to the adult. M. TOEPLITZ.

b.—OZENA.

68. SISEMSKI. **On the serum treatment in ozena.** *Russkij Wratsch*, No. 30, 1904.

68. Two cases of ozena are reported which have been treated with anti-diphtheritic serum. In one case which showed a marked improvement the subsequent course could not be followed. The second case recovered. SACHER.

c.—TUMORS.

69. BROECKAERT. **Ethmoidal endothelioma. Contribution on the surgical treatment of malignant tumors of the nose.** *La Presse oto-laryngologique Belge*, 1905, Book 3.

69. This endothelioma of the ethmoid bone had produced exophthalmos and marked swelling of the face. In the nose there was an irregular, nodular, easily bleeding tumor growing from the superior meatus of the nose. BRANDT.

d.—SEPTUM.

70. BAUMGARTEN. **Hematoma of the septum, their course and some methods of treatment.** *Wiener klin. Rundschau.* No. 13, 1905.

71. SCHIRMUNSKI. **On the operative treatment of deviations of the nasal septum.** *M. f. O.*, No. 10, 1904.

70. Constant pressure is exerted with carbolated cotton. Among forty cases which were treated in this manner an abscess developed in five. The average duration of treatment consisted in seven to ten days.

The same treatment is followed in perichondritis and abscess. If there is no change after three or four days an incision is made.

WANNER.

71. This is a method devised by the author whereby the septum is divided by a forceps cutting in a crucial fashion. The septum is then retained in its normal position by a compressor and finally by the insertion of metallic tubes. PIFFL.

e.—DISEASES OF THE ACCESSORY CAVITIES.

72. MARTIN. **On the significance of occlusion of the ostia in inflammatory diseases of the maxillary sinus,** *M. f. O.*, No. 2, 1905.

73. CORDES. **On the treatment of chronic empyema of the maxillary sinus.** *M. f. O.*, 1905. No. 1.

74. ZIEM. **On anosmia, parosmia, and parageusia.** *M. f. O.*, 1904, No. 9.

75. GORIS. **A contribution to the surgery of the base of the brain.** *La Presse oto-laryngologique Belge*, 1905, Book 2.

76. TURNER, A. L. **The operative treatment of chronic suppuration of the frontal sinus with special reference to the method of Killian.** *Journ. Amer. Med. Assoc.*, February 4, 1905.

77. MUNRO, J. C. **Psammoma of the maxillary sinus.** *Med. News*, March 4, 1905.

72. Three cases of acute empyema of the maxillary sinus are reported, in which, after puncture had been performed through the lower meatus, irrigation was not possible. The cases recovered after

a very short time. According to the author, this favorable action was due to the restoration of the normal atmospheric pressure in the closed-off and hyperæmic maxillary cavity, and he recommends that the maxillary sinus should be opened from the inferior meatus if there is a suspicion of incomplete ventilation of the cavity.

PIFFL.

73. The author recommends the Mikulicz-Krause operation in chronic empyema of the maxillary antrum, which consists in introducing a large trochar from the inferior meatus with subsequent irrigation and insufflation of iodoform powder. After the discharge is diminished the cavity is to be treated dry. According to the author's statistics, of 36 cases 83. 3% were permanently cured.

PIFFL.

74. ZIEM describes the frequent combination of anosmia and subjective kakosmia with diseases of the accessory cavities, especially of the maxillary antrum. The many interesting features of this paper are not suited for a short review. PIFFL.

75. A child of eleven years of age was operated upon for a chronic empyema of the sphenoidal sinus by removal of the middle turbinal and exposure of the neighboring cells whereby a fistula was found which led into the cranial cavity. The floor of the sphenoidal cavity was healthy. The process was situated between the ethmoidal and sphenoidal bones. Twenty-four hours later there was a sudden rise of temperature to 43.3 °C., hiccough, rigidity of the neck, the pupils were dilated and immobile, pulse 104, unconsciousness and paralysis of the sphincters. To expose the focus the external nose was retracted as for resection of the superior maxilla, the soft parts of the orbital cavity were separated from the inner wall and the ethmoid was resected, exposing the sphenoidal cavity. The outer and the upper wall of this cavity were removed until underneath the chiasm. A piece of gauze was introduced through the nose; the wound was sutured. On the following day a large quantity of greenish pus escaped from the nose. The temperature then dropped, with the restoration of consciousness and all symptoms were improved. Three days later death from meningo-encephalitis. BRANDT.

76. TURNER brings the total number of intra-cranial frontal sinus complications up to forty-two. He holds that intranasal treatment cures but a very small number of cases, and that it should

be carried out as a preliminary to an external operation on the sinus. The Ogston-Luc operation through the anterior wall fails to reach recesses of the operated sinus, a communication between the two sinuses and the anterior ethmoidal cells, which are implicated in 62%, and thus resulted in a percentage of only 58 successful operations. Of the 67 cases operated by the Kuhnt operation, in which the floor is also removed, a cure was effected in all but one. Of the 24 fatal cases, 17 (74%) occurred after the Ogston-Luc operation (in 15 after a single, in 2 after more than one operation); in 6 radical operations 3 were secondary after simple opening, so that multiple operations seem to exercise a detrimental effect. The disfigurement is smaller in the Luc method, which is less curative. Osteo-plastic operations give good cosmetic, but doubtful curative results. Killian's operation, which removes the anterior and inferior walls and the frontal process of the superior maxilla and leaves the supraorbital bony ridge, gives access to the entire cavity, recesses and ethmoidal cells and nasal cavity, with a minimum of disfigurement and almost complete obliteration of the sinus. Of 29 cases thus operated, 26 (83%) were cured. M. TOEPLITZ.

77. A woman, about twenty years old, had noticed in her fourteenth year that the left eye was a little more prominent than the right. This became more marked, and now it is a disfigurement. Left eye shows marked proptosis, lids close with difficulty, and the apex of left cornea is 2 *cm* anterior to that of the right eye. The movement is limited, 50° less than normal. The eye could be drawn back and upward. Palpation revealed a smooth, rounded mass in lower part of orbit, beginning at the infraorbital ridge and running up and backward; the bulk of the mass was back of the equator of the globe. The ridge of the orbital floor was not involved. Laterally the mass extended to the side walls of the orbit at the level of the canthi. Kroenlein's operation for exposing the orbit was carried out. A slightly fluctuating tumor was found lying behind, below and to the outer side of the globe, and on chiselling the outer wall of the orbit, a large cyst-like tumor was encountered, full of gritty material, feeling like a mixture of sand and putty. From an opening through the mouth into the antrum a drachm of puriform mucus escaped, but above it there was the same gritty material. Inner surface of the wall felt rough. After dressing, œdema and foul discharge persisted; convalescence

was unsatisfactory. Second operation, two months after the first: Left common carotid closed by clamp. The antrum was free from growth. A fulness was felt posterior to upper jaw. The anterior wall of the latter was removed as far as the infraorbital foramen. The hard tumor in the roof of the pharynx was psammomatous and similar to that found on first operation. More growth was found in the sphenoidal and ethmoidal cells of both sides and around the left lateral wall of the nasal cavity which was removed. The vomer, pushed to the right, was not involved. The tumor was also on the upper surface of the palate, which was normal. The growth extended to the frontal sinuses, not involving them. No recurrence in orbit, rapid convalescence. The tumor looked like fine sand soaked with blood; it effervesced with hydrochloric acid, the granules did not dissolve, but were easily separated. It was decalcified in sulphuric acid. The calcareous bodies separated by tissue consisted of spindle cells without intracellular substance, nodules 50 to 70 *mm* in size, concentric, close together. Diagnosis; Psammoma, possibly sarcomatous. No evidence of return after sixteen months; exophthalmus still persisted. M. TOEPLITZ.

f.—OTHER DISEASES OF THE NOSE.

78. HENLE. **On the treatment of acute coryza.** *Deutsche med. Wochenschr.*, No. 6, 1905.

79. BAUMGARTEN. **Periodic hemorrhages from the upper respiratory passages.** *Arch. internat. d' Otologie*, etc., vol. 19, p. 31.

80. WOLFF. **On the connection between fibrinous rhinitis and diphtheria.** *Deutsche med. Wochenschr.*, No. 2, 1905.

81. HALASZ. **A case of rhinolith and consecutive purulent otitis media.** *A. f. O.*, vol. 63, p. 214.

82. GOLDMANN. **A case of necrosis of the lower turbinal and of the ethmoid bone.** *Prager med. Wochenschr.*, 1904, No. 26.

83. COHN. **On congenital atresia of the choana.** *M. f. O.*, No. 11, 1904.

78. HENLE has experimented upon himself and a number of patients suffering from acute coryza with the congestive procedure of Bier, and has observed excellent results inasmuch as all the patients were almost momentarily relieved of the unpleasant symptoms (pressure in the head, a sense of irritation, lachrymation, and so forth) and on the following day recovery occurred. In only one case of chronic coryza the treatment was of no avail, possibly be-

cause it could not be practised in the proper manner. The congestion was produced by a rubber tube for 2-5 hours, the pressure never rose over 25 mm. The treatment is not adapted for persons with arteriol sclerosis. NOLTENIUS.

79. A review of the periodic hemorrhages occurring from the upper respiratory passages. The author makes the following divisions: 1. Hemorrhages before the onset of menstruation. 2. Hemorrhages in place of menstruation. 3. Hemorrhages during menstruation. 4. Hemorrhages during pregnancy. 5. Hemorrhages of the menopause. OPPIKOFER.

80. WOLFF has observed three boys who suffered from a disease known as fibrinous rhinitis though they were otherwise in perfect health. In each true diphtheria bacilli were found present. The sister of the first boy was taken ill a short time later from severe diphtheria of the throat. In the latter patient diphtheria bacilli were also found in the tonsil membranes. The author therefore opposes the frequently expressed view that fibrinous rhinitis is a harmless disease and that the diphtheria bacilli found in this and similar cases where severe constitutional symptoms are absent are only accidental parasites. He is of the opinion that in almost all cases of fibrinous rhinitis diphtheria is the cause and that these patients, notwithstanding the absence of fever and undisturbed general health should be regarded as suffering from diphtheria and treated from this standpoint. NOLTENIUS.

81. After removal of a rhinolith 2 cm. long and 1½ cm. broad, the middle ear suppuration which had existed for two months ceased. HAENEL.

82. A woman, twenty-eight years of age, had suffered after puerperal infection from metastatic inflammation in the frontal bone with separation of two particles of bone, which apparently produced epileptic convulsions. Twelve years later the necrotic turbinal imbedded in the granulations was removed from the right side of the nose. This had produced no symptoms except headache. PIFFL.

83. This is a careful description of a congenital occlusion of the left choana in a boy eleven years of age. The etiology and the symptoms of this anomaly are then given. PIFFL.

g.—NASOPHARYNX.

84. DÖLGER. **A remarkable case of acute inflammation of the pharyngeal tonsil.** *M. f. O.*, No. 9, 1904.

85. ESCAT. **The result of a too thorough curettage of the nasopharynx after removal of adenoid vegetations.** *Arch. Internat. d' Otologie*, vol. 19, p. 40.

86. LAVAL. **Malignant tumors of the nasopharynx.** *Arch. Internat. d' Otologie*, vol. 19, p. 55.

84. A soldier, nineteen years of age, suffered from toothache. This was followed after a few days by headache, pain in the left half of the head, lachrymation, difficulty in swallowing, and fever. The fever disppeared, but the headache became more intense with insomnia, loss of appetite and finally symptoms of intracranial complications, viz., subnormal temperature with slow pulse, vomiting and vertigo. The cause of these symptoms was found to be a severe inflammation of the pharyngeal tonsil with formation of an abscess. Four weeks later the man was able to return to his work.

PIFFL.

85. The Gottstein operation was undertaken by a non-specialist; the procedure was arduous and protracted. This was followed by an adhesion of the soft palate to the posterior pharyngeal wall. The patient subsequently came into the hands of Escat who divided the adhesion. It was then found that the adenoid vegetations still existed.

OPPIKOFER.

86. Forty-five cases of sarcoma and twenty-seven cases of carcinoma of the nasopharynx are collected from literature. Seven additional cases of malignant tumors of the nasopharynx are added. Operation is recommended by the internal passages, though this procedure is often only palliative.

OPPIKOFER.

MOUTH AND PHARYNX.

87. GENTER. **On the pathology of hyperplastic pharyngeal and palatal tonsils.** *Dissertation, St. Petersburg*, 1904.

88. HARTMANN. **A tonsil curette.** *Med. Klinik*, No. 2, 1905.

89. BERGH. **A case of nervous symptoms after tonsillotomy.** *M. f. O.*, No. 12, 1904.

90. SPICKER. **On the treatment of syphilitic lesions of the mouth, of the pharynx, and of stomatitis with concentrated solutions of chromic acid.** *Russki Shurnal*, etc., September, 1904.

91. JASSINOWSKY. **A case of ptyalism.** *Wiener klin. therap. Wochenschr.*, No. 8, 1905.

92. BRYANT, ALICE G. **A new tongue depressor.** *The Laryngoscope*, February, 1905.

93. JARECKY, H. **Calculi in Blandin's and submaxillary glands.** *N. Y. State Journ. of Medicine*, February, 1905.

94. INGALS, E. F. **Tonsillectomy, thorough, painless and safe.** *Journ. Amer. Med. Assoc.*, February 4, 1905.

95. INGALS, E. F. **Fibrolipoma of the pharynx and larynx.** *Amer. Medicine*, February 4, 1905.

96. CARTER, W. W. C. **Growth of bone in the tonsil.** *Medical Record*, February 4, 1905.

87. The tonsils which were examined were obtained partly from the living and partly from cadavers, thirty-eight cases in all. The examinations showed that the tonsils attained their full development at the 6th month of life, that regressive metamorphosis (connective tissue hypertrophy) appears macroscopically in the 40th year, though it can be recognized with a microscope in the 20th year. The hyperplastic tonsils differ only in their unusual size and the pronounced hyperæmia. In hyperplasia of the pharyngeal tonsil proliferations of the lymphoid or the connective tissue may be recognized in the earlier age; later the distinction between these two becomes more difficult on account of the transformation of the primary connective tissue into lymphoid tissue. The development of cartilage into connective tissue of the tonsils is not a remnant of the bronchial arches, but develops from the fibrinous connective tissue.

SACHER.

88. The tonsil curette consists of a metal shell and serves to clean the tonsils for diagnostic and therapeutic purposes. The writer has employed this instrument almost daily for many years. He was astonished to find how much could be expressed out of the tonsils, sometimes a sero-purulent fluid, occasionally cheesy masses and so-called tonsillar concretions.

The expression of the tonsils takes place by pressure on the anterior palatal arches, especially on the upper part, because in this region fluid and concretions are most frequently found. On exerting pressure the yellowish sero-purulent fluid or the thick mass appears on the surface and is expectorated by the patient. Pressure may be exerted also in other directions. In the case of round tonsils and during contraction of the pharyngeal muscles the tonsil curette is apt to slip, causing an unpleasant sensation to the patient, which is, however, not of any importance. Small extravasations of

blood may occur. It is remarkable how quickly tonsils are reduced in size after expression. AUTHOR'S REVIEW.

89. In the case of a nervous but well developed girl of seven years of age, both the palatal tonsils and the pharyngeal tonsils were removed at one sitting. After the removal of the first palatal tonsil severe retching with convulsive retraction of the thighs occurred, lasting from three to four minutes. Three hours after the operation was ended another small attack occurred, associated with hemorrhage from the nose, and was repeated in the next hours with profuse hemorrhages, so that the child became very anæmic. After the local application of styptic remedies the hemorrhages were terminated though the attacks of retching continued for two days. The neuropathic disposition of the child is held responsible for this occurrence. PIFFL.

90. Applications are made of 10 or 15% solutions of chromic acid by means of the cotton applicators directly to the affected parts. The healthy mucous membrane is not to be invaded. The applications are painless. They do not cause any poisonous symptoms and should be applied two or three hours before eating. After the applications are made gargles are given. The results were very good. SACHER.

91. In a patient twelve years of age hysterical attacks set in, followed after several months by profuse discharge of saliva, which was arrested during sleep.

This is an unusual neurosis, a monosymptomatic variety of hysteria.

The treatment consisted in general neurotonic directions, improvement of nutrition and suggestion. Hydrotherapeutic procedures. After half a year all of the functions were again normal. WANNER.

92. The tongue depressor is made of steel and measures 24 *cm* from tip of blade to end of handle. The latter is at an angle of 40°. The curve of the blade and the angle it bears to the perpendicular line brings uniform pressure along the whole surface of the tongue, at the same time drawing it forward at its base.

M. TOEPLITZ.

93. JARECKY reports three cases. Case 1. Calculus in Blandin's duct associated with one in Wharton's duct, very rare, in a man,

aged thirty-four, the first removed with a quantity of pus, the second eight months later. Case 2. Calculus in Wharton's duct, large size stone, six grains, without symptoms, removed from a man, aged thirty-nine, with two drachms of pus. Case 3. Small calculus with intermittent swelling of the snbmaxillary gland.

M. TOEPLITZ.

94. The instruments required for tonsillectomy are: A mouth gag, tongue depressor, blunt hook, tonsil forceps, long forceps, two snares with wire No. 5, and sponges. The instrument for separating the anterior pillar of the fauces has two blades, which, when closed and locked, form a blunt hook, when opened, separate the pillar from the tonsil by a single movement. The tonsil forceps is about 8″ in length, with a catch on the handles. The blades, 1″ wide, turning at an angle of 45° to the long axis, are rounded toward the end, which consists of two blunt points, each ⅛″ wide, separated ⅜″ from each other by a crescentic depression, leaving an elliptical opening ⅜″ long and ¼″ wide, when the points of the blade are brought into contact. The forceps, 8″ long, holds the end of the uvula. The tonsil is removed under a general anæsthetic, the patient being in a prone position. M. TOEPLITZ.

95. A man, aged twenty-eight, had difficult breathing, swallowing and a muffled speech. A large tumor, apparently a fibroid, nearly filling the laryngo-pharynx, was for the greater part removed with écraseur, and the remaining nodules were cauterized. The first part was fibrous, the latter fatty. Size 4.5 : 3×8 *cm*. After five and a half years a large mass extending from the base of the tongue downward to the arytenoid cartilage, attached by a broad base to the right side of the pharynx, and also the right edge and anterior surface of the epiglottis was filling 3/5 of the laryngo-pharynx, 5 *cm* long and standing out 2.8 *cm* from the wall of the pharynx. After pulling the first part of the tumor out, the patient was choking and tracheotomy had to be peformed. The remaining portion of the tumor was removed under cocain with a wire loop. It measured 3¾ : 3⅜ *cm*. The larynx partially obstructed by a small portion of the tumor, which was removed. A large mass on the right side of the pharynx 2 : 3⅜ *cm* remained. The choking was caused by a part of the very movable tumor having fallen through the opening made in the mucous membrane by the removal of the first mass. M. TOEPLITZ.

96. A woman, twenty-two years old, had repeated attacks of tonsillitis, during the last ten years as many as a dozen peritonsilar abscesses, most of which on the left side, the last a month ago; between the attacks the throat had never felt well. The tonsils showed signs of acute inflammation, dense fibrous masses, slightly larger than normal and firmly adherent to the pillars. The right tonsil was removed with the tonsillar punch. The left could not be grasped with it, owing to a solid mass contained therein, which was freely movable, not attached to the bony skeleton and was removed with long scissors. It was ¾″ long, ½″ wide, ¼″ thick. From a study of the microscopical examination made by JONATHAN WRIGHT and illustrated by two pictures, and from an extensive analysis of the cases reported by others, CARTER is inclined to believe that the bone originates from metaplastic changes in the connective tissue, and not from the bronchial arch. M. TOEPLITZ.